

TECHNOLOGY

REVIEW *April* 1950

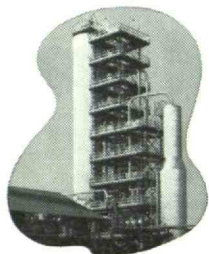


technology review

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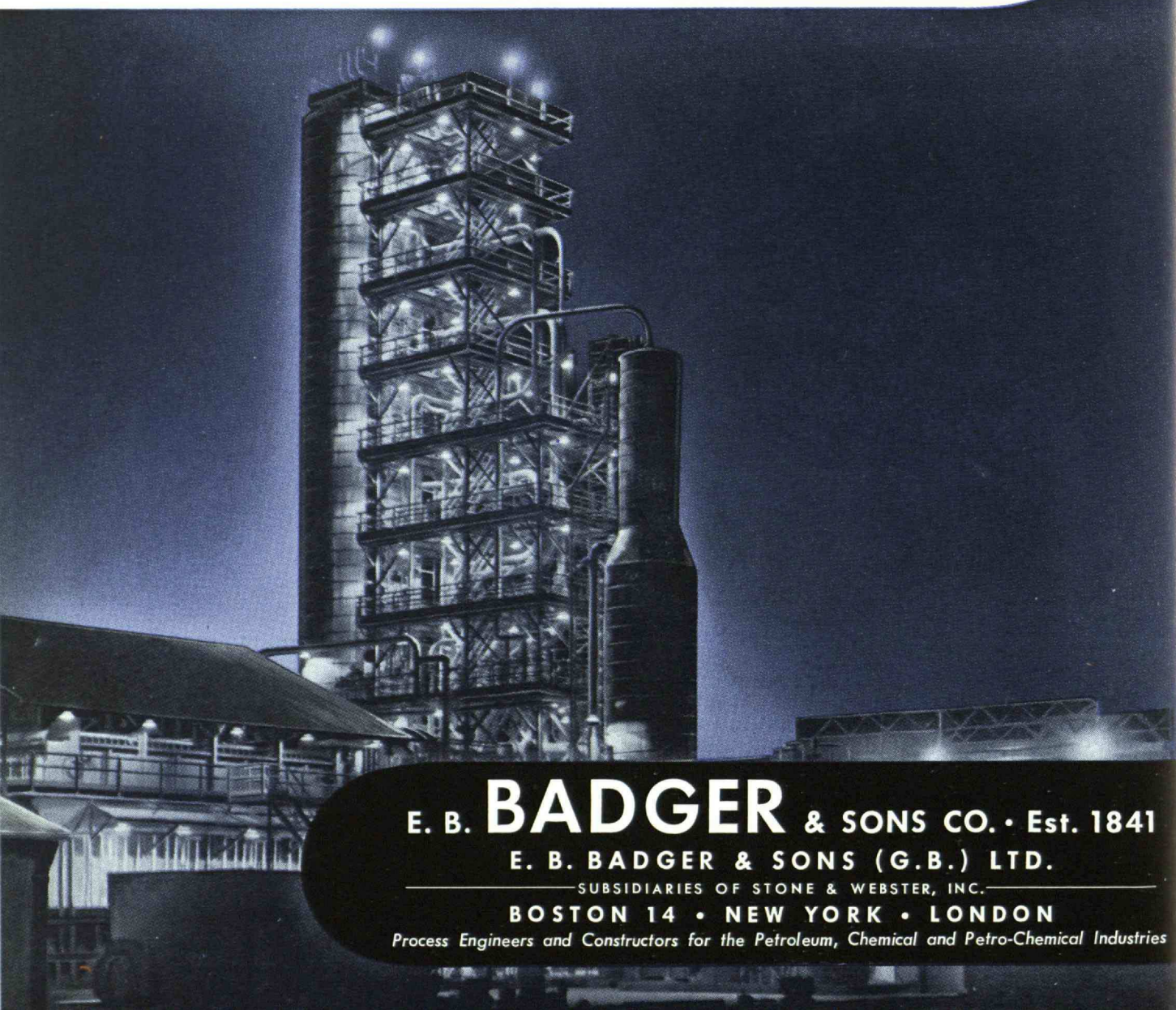
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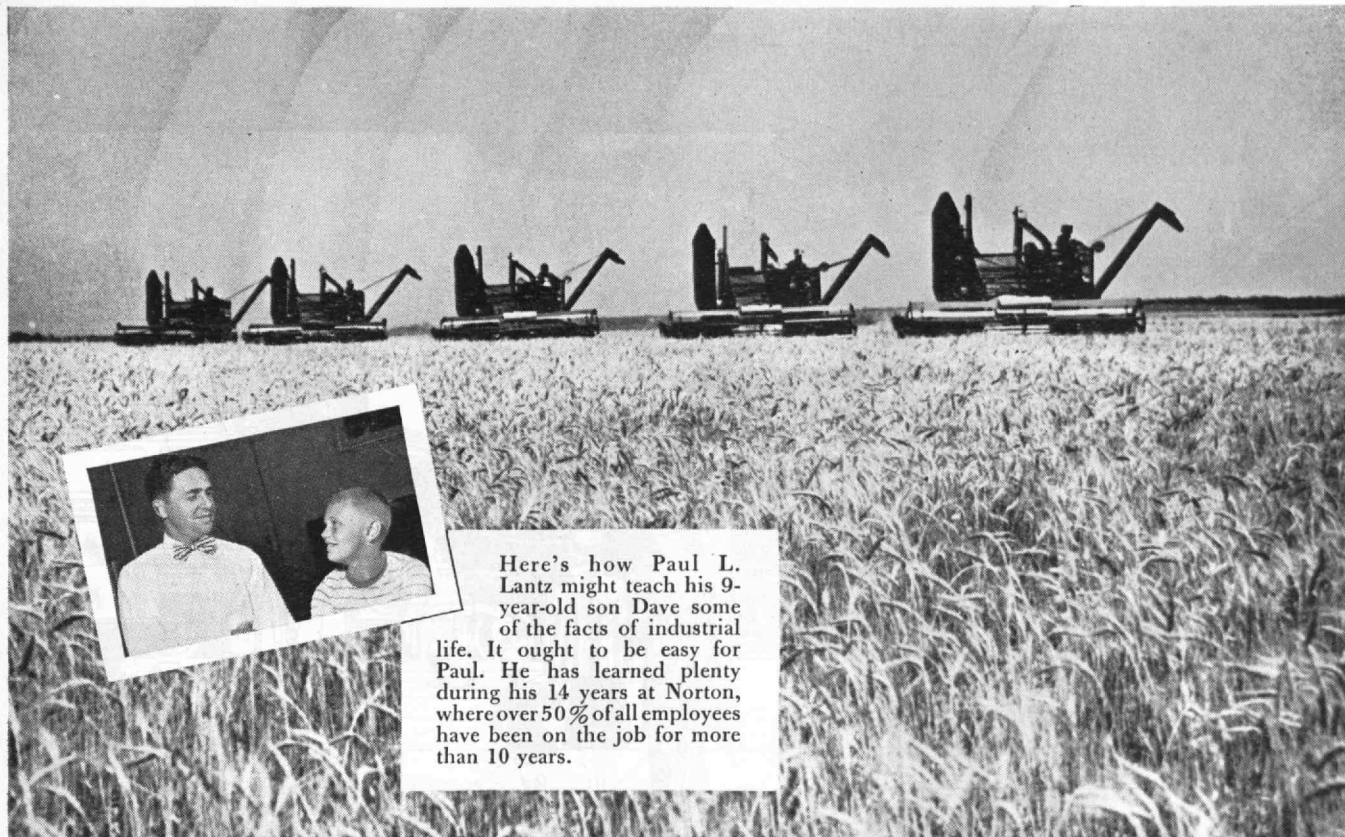
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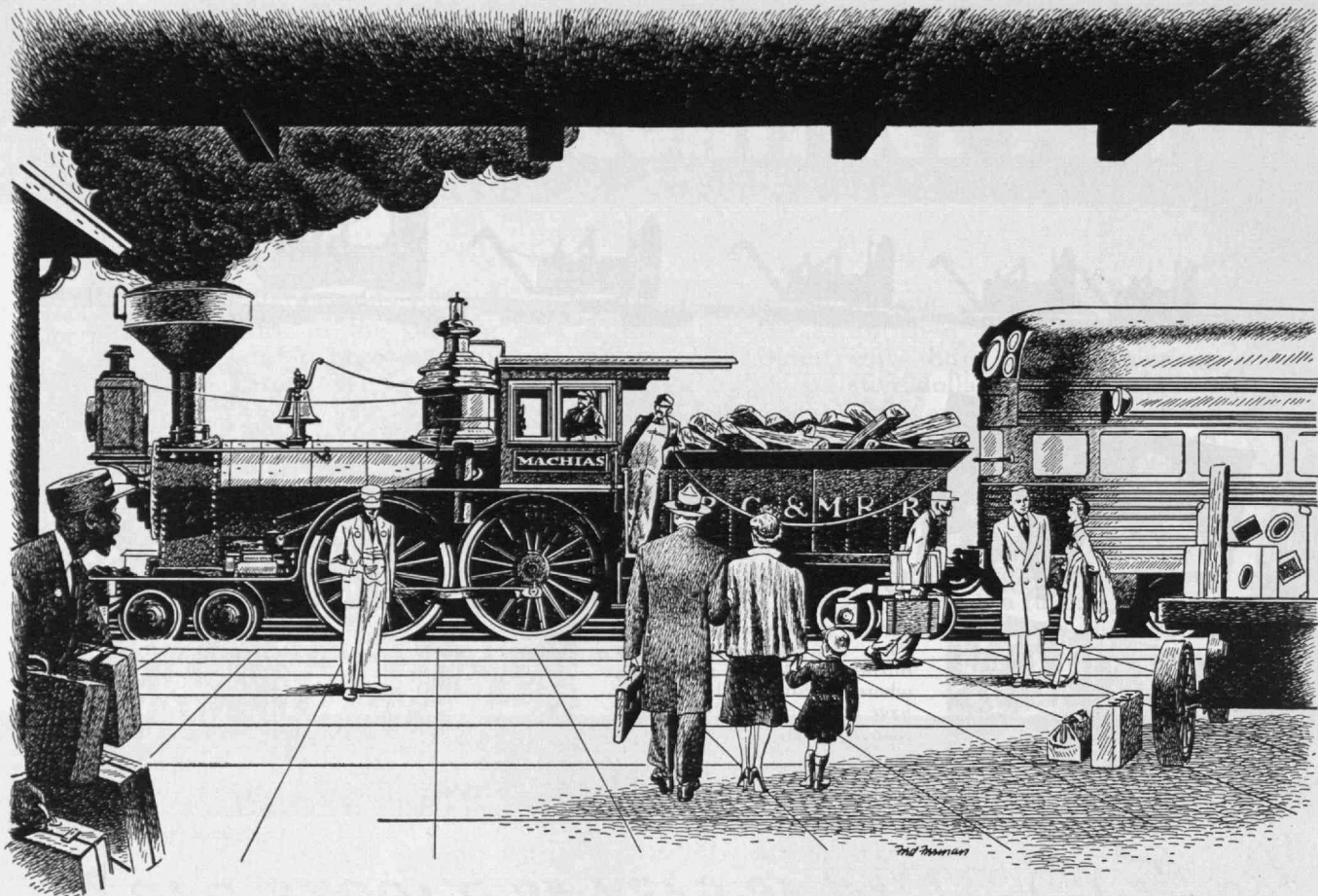
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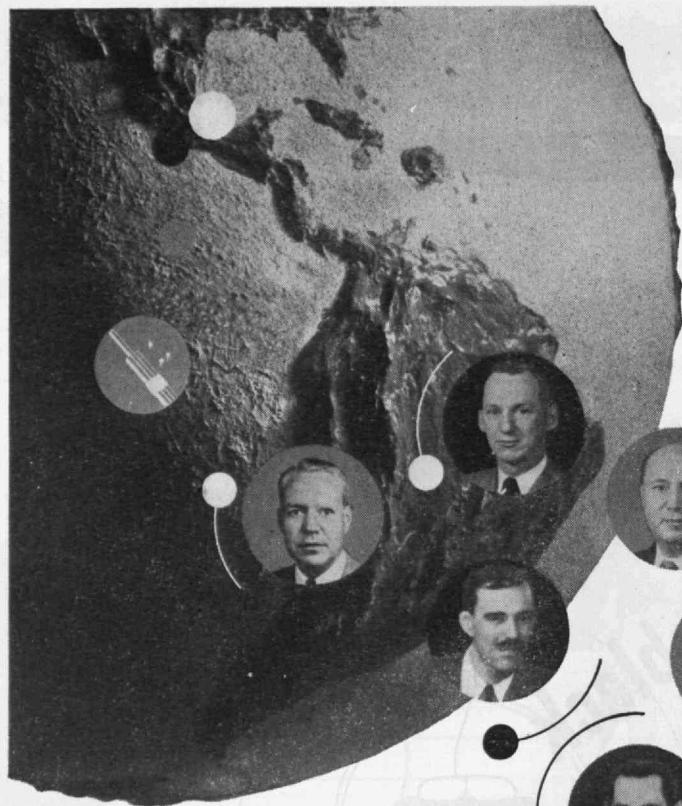
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What GENERAL ELECTRIC People Are Saying

W. L. FLEISCHMANN

Apparatus Department

TURBINE ALLOYS: The application of alloy steels to high-temperature steam-turbine service relies on the accumulation of metallurgical data which are unique in some respects. Where it can usually be assumed that the properties of metals do not change, under the influence of high temperature continuous changes take place. Where ordinarily it is correct to assume that plastic deformation will occur only beyond a certain stress, at high temperatures even low loads cause constantly increasing deformation.

With a long-life turbine, the data obtained from laboratory tests are then in reality only guides which, by extrapolation, become the bases on which the alloy is formulated and the design stress set.

To allow extrapolation, one constantly has to search for indications which may be small in even a year-long test—but may become important in the long life of a turbine. Constant refinements in the test procedures and the theories of the mechanical and thermal behavior of metals under the influence of stress and temperature are, therefore, necessary to enable us to design the heat-resistant steels.

We are confident that this approach is sound, based upon the year-by-year improvement in thermal efficiency of turbines to 37 per cent, caused in no small measure by the average yearly advance of 12 F in steam temperature maintained for 40 years. These metallurgical developments benefit all of us, since, with the modern efficient turbines, the power industry is able to deliver electricity at low cost to the consumer.

*Louisiana Engineering Society,
New Orleans,
January 13, 1950*



F. B. SCHNEIDER

Apparatus Department

CYCLONE DUST COLLECTORS: Independent of the design, all "cyclones," from the ancient centrifugal dust collectors to the modern vortex collector, suffer from a common handicap. This disadvantage is the large pressure drop caused by the

whirling motion of the gas while performing the cleaning action. In addition, with higher dust-separation efficiency, the pressure drop increases, so that the highly efficient vortex collectors have a pressure drop which is a multiple of the pressure drop of the common centrifugal separators. Since the latter are mostly used in connection with the cleaning of large volumes of air, the power consumed is considerable, and even small reductions of the pressure will provide substantial savings of horsepower.

The pressure drop across cyclone dust collectors can be reduced by relatively simple means. A recovery of 75 percent can be attained on centrifugal separators by employing gradually enlarged tangential inlets together with cylindrical hoods at the outlet. The pressure drop across vortex collectors can be reduced by approximately 80 percent by using diverging inlets and recovery drums at the outlet which discharge clean air into ducts. If the vortex collectors discharge the air into the atmosphere, the pressure drop across them can be decreased by 34 percent with two concentric cones at the outlets, and by amounts up to 80 percent when these cones are combined with a diverging tangential inlet.

*General Electric Review,
February, 1950.*



R. O. FEHR

General Engineering & Consulting Laboratory

SOUND PLEASANTNESS: The pleasantness or unpleasantness of a sound determines if an equipment is acceptable from the acoustical standpoint. Sound intensity meters now being used in industry do not give this answer . . . they tell as much about the pleasantness of a noise as a light meter tells about the quality of a painting.

Instruments based on new concepts must be built. We believe that

the ultimate will not be achieved in the near future, but we are well on the way to obtaining practical instruments which are far superior to anything we had several years ago.

*American Society for Metals,
Terre Haute, Ind.,
January 9, 1950*



K. H. KINGDON

Knolls Atomic Power Laboratory

ATOMIC-ENERGY TRAINING: About 60,000 people are now engaged in the new and potentially large field of atomic-energy work. At present these people are employed directly by the Atomic Energy Commission and its contractors. If the production of power from atomic energy becomes an economic reality, such production will doubtless be participated in by private industry and will demand additional technical people.

Most of the technical people to be used in the atomic-power effort in the future will need training in special fields of current engineering, and in physical, chemical, and metallurgical skills. Perhaps ten percent will need the new fission and neutron knowledge of modern nuclear physics. Some of this they will be able to get in universities, but security restrictions and the probably continued general unavailability of nuclear reactors and other expensive and restricted equipment and materials will mean that much of the specialized technical knowledge will have to be obtained on the job.

A considerably larger group than the ten percent mentioned, and consisting of chemists, chemical engineers, and health physicists, will need practical knowledge of how to handle radioactive materials in bulk. Here, again, this knowledge will probably have to be obtained on the job.

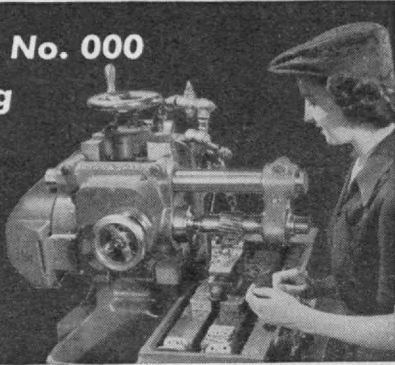
*General Electric Review,
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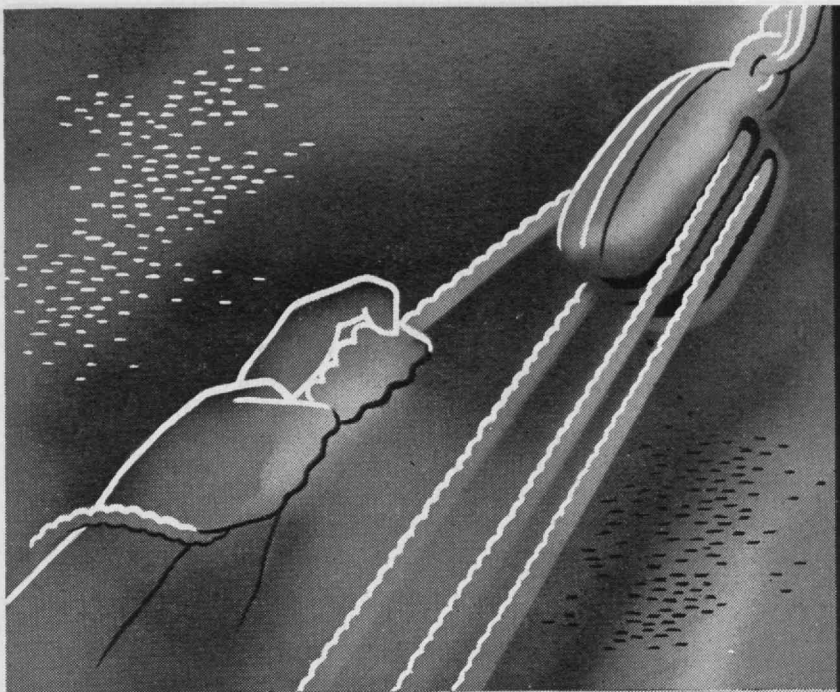
THE TABULAR VIEW

Education. — An examination of certain phases of the relatively greater progress which has been made in the physical sciences, as contrasted to human, social, or ethical studies, appears in "American Education in a Quandary" by C. C. FURNAS, Part I of which appears (page 304) in this issue. Since receiving his B.S. degree from Purdue University in 1922 and a Ph.D. from the University of Michigan in 1926, Dr. Furnas has been associated with the United States Bureau of Mines, Yale University, and, during World War II, the National Defense Research Committee. In 1943 he was appointed by Curtiss-Wright Corporation to take charge of its research laboratory. When this laboratory was given to Cornell University in 1946, Dr. Furnas became, and has since been, director of the Cornell Aeronautical Laboratory.

Earthenware. — The age-old, traditional methods, in which manual operations and trade secrets played a major role in pottery, are giving way to newer modes of operation employing mass production, and new uses for ceramics are being developed as the hand of science touches this field. Recent progress in ceramics is reviewed in "Science Enters the Ceramics Art" page 307) by FREDERICK H. NORTON, '18, Professor of Ceramics in the Department of Metallurgy at the Institute. The significant role which M.I.T. is playing in this transition is apparent as Professor Norton's graduate students assume responsible positions in the ceramics field. Professor Norton received his Sc.D. degree from Alfred University in 1949. He is author of two books — *The Creep of Steel at High Temperatures*, and *Refractories*.

Enemy. — Under present conditions, the effort of scientists is required in the preservation of industrial society just as much as it is necessary in warfare. Civilian defense against air invasion is the topic of "Air Defense" (page 312) by ERVIN H. BRAMHALL, '27, with pen-and-ink drawings by H. G. Miller. After receiving his A.B. degree from Stanford University in 1926, Dr. Bramhall obtained an S.M. from M.I.T. in 1928, and in 1931 his Ph.D. from Cambridge University in England. He was a research associate in the M.I.T. Department of Physics during 1932-1933, then served as physicist with the Byrd Antarctic Expedition in 1933-1934. During World War II he was operations analyst, Pacific Theater, and is now in the Operations Research Office, Johns Hopkins University.

Encounter. — In "Athletics at M.I.T." (page 315) WARREN BERG traces the development of physical recreation at Technology and outlines the scope of its present activities. Mr. Berg received the degree of B.S. in engineering from Harvard University in 1944, but found athletics more enticing than engineering. He coached Freshman basketball at Harvard for three years before coming to M.I.T. as varsity baseball coach and assistant basketball coach. In addition, he is publicity adviser for the Athletic Staff.



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Real Co-operation

FROM W. O. WEBBER:

I have read Dr. Montagu's article "Living in an Atom-Bomb World" which appeared in the February, 1950, issue of The Review. I agree.

But he skipped. Concerning our need for active world co-operation, he said: "If we are to evaluate the answer in terms of what we do, rather than what we say, the logical conclusion is that we do wish to see the end of ourselves, and of our children and their children." And again: "There is only one thing that can save us, and that is to stop talking about brotherhood and to live it." And again: "Congress is waiting for the people to tell it what to do. If we raise our voices, we shall be heard."

After these very sound suggestions, he recommends re-constitution of the United Nations. Instead, I suggest . . . (1) making an existing French university into an international university, with the permission of course of the existing university. Invite adult students from industry, government, and other university staffs. (2) Plan and activate international research on projects of mutual concern: on medicine, for example, in heart disease and the common cold; on engineering, for example, in road building and design; on languages. Have our national professional societies suggest research programs. (3) . . . scheduling sports events where sportsmanship will be encouraged. (4) Promote an internationally participated-in play to tour the world . . .

Only after co-operation is real will the advantages of peace be apparent — when co-operation can cease only at an obvious disadvantage to all concerned.
Baytown, Texas

The Gloucester Fisherman

FROM SIDNEY L. KAYE, '30:

My sincere thanks for printing The Gloucester Fisherman in the March, 1950, issue of The Review. I notice that on the Contents Page you have captioned the picture as being a photograph. Of course it is a pen-and-ink drawing, and you may wish to correct this in a future issue.
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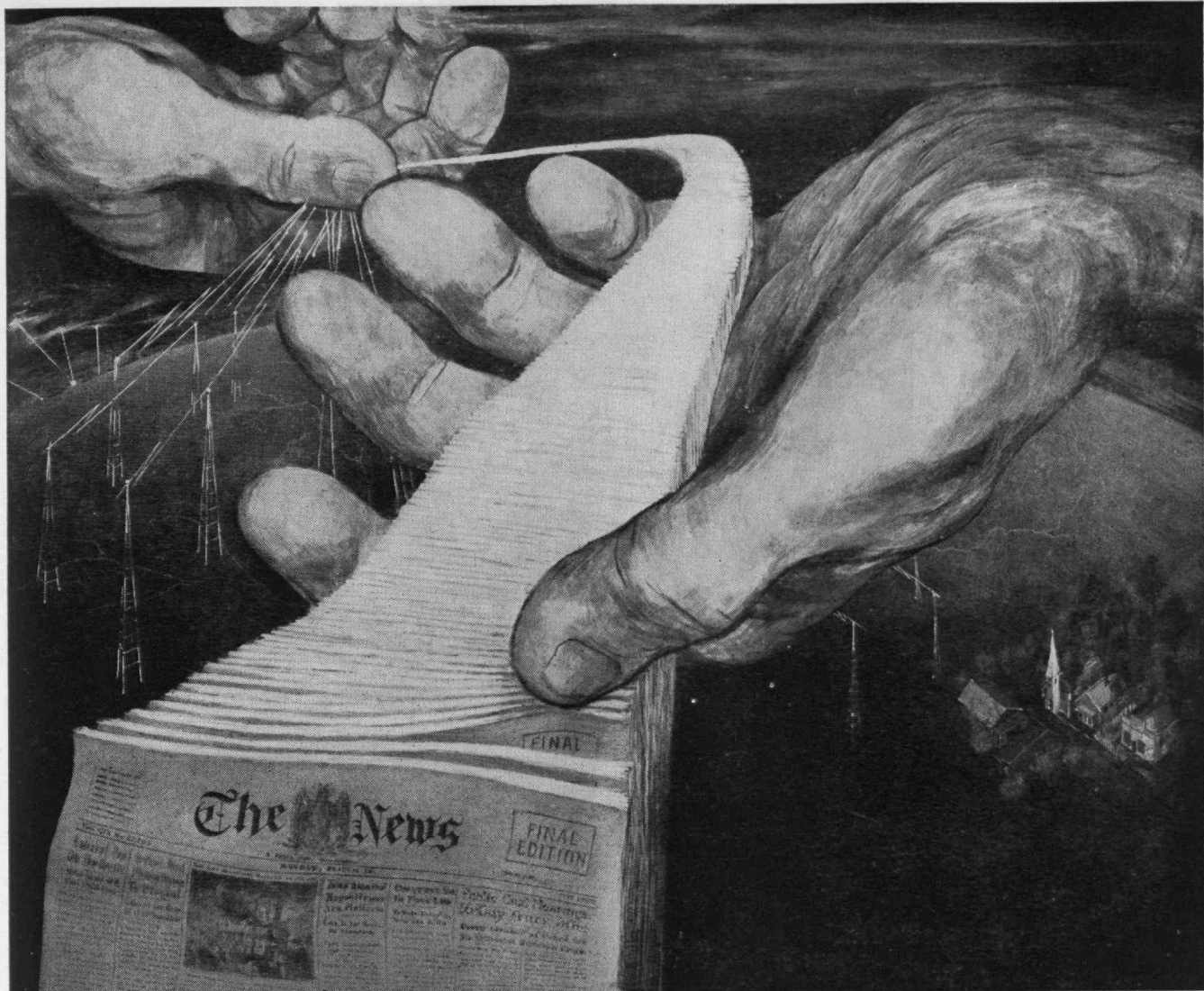
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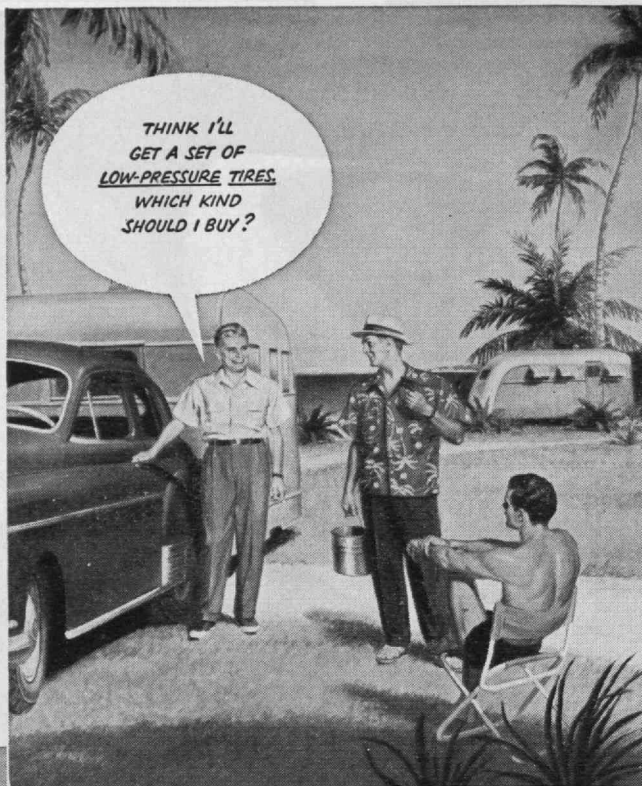
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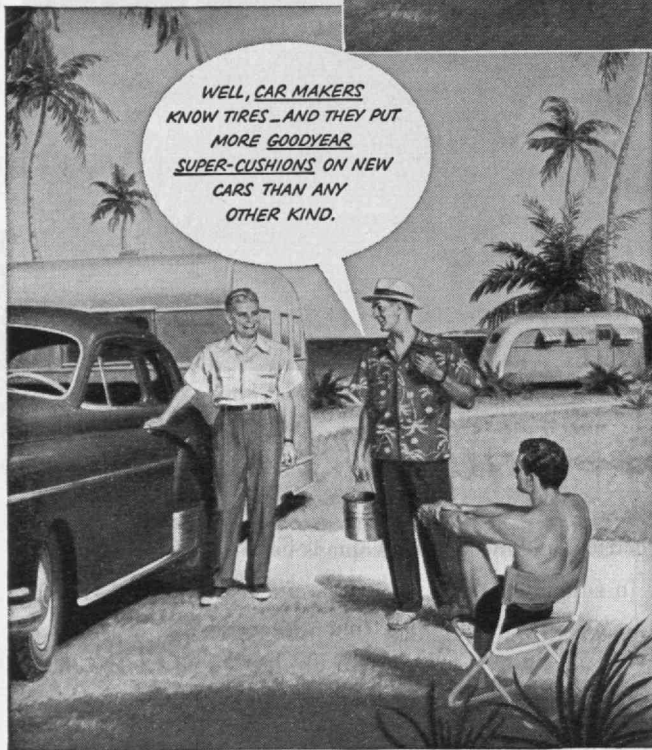
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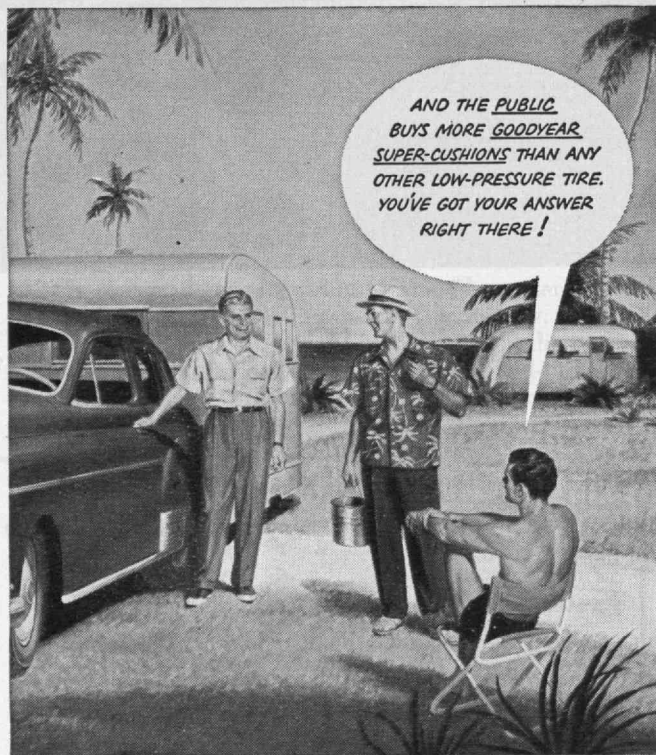
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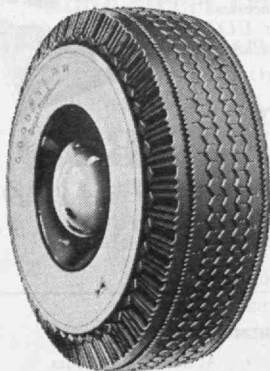
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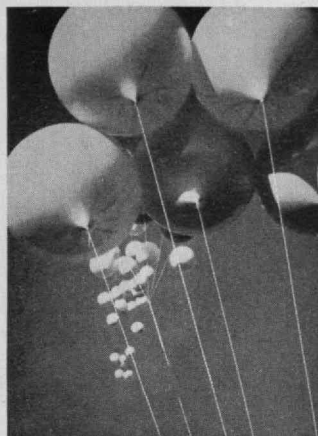
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THE TECHNOLOGY REVIEW

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Some thoughts are presented on the important question:

"How can modern man, in one short lifetime, learn to live and also learn to make a living?"

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We face the problem, in the world today, of finding ways to maximize military effectiveness at minimum cost if this nation is to remain solvent

ATHLETICS AT M.I.T. BY WARREN BERG 315

From the first, athletics at M.I.T. has been used to build sound bodies and minds, not to develop specialized "stars"

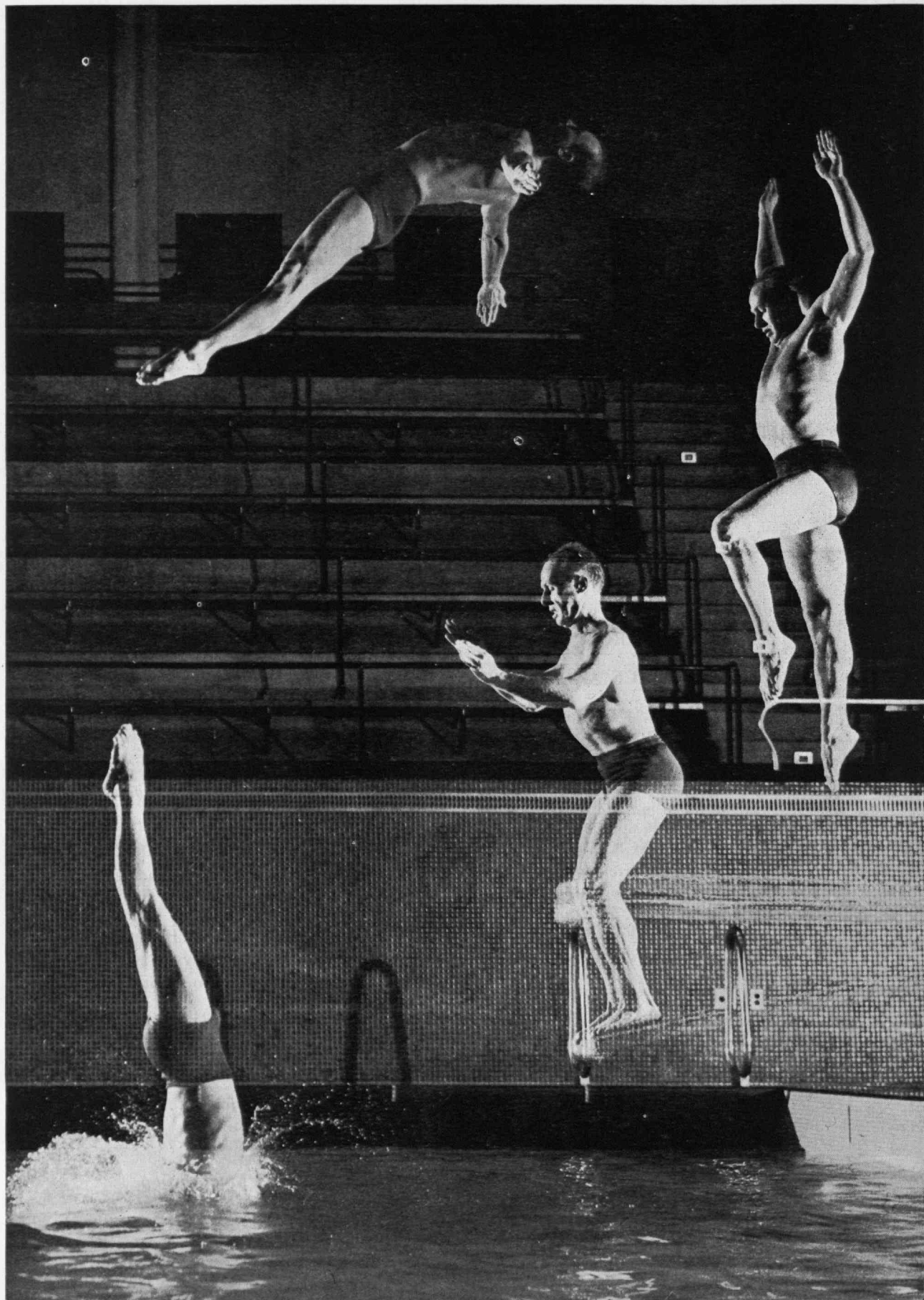
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Harold E. Edgerton, '27

Science and Sports

... are combined in this unusual photograph showing four distinct phases in a back dive executed by Charles Batterman, diving coach at Harvard University. This composite photograph, of four separate and manually timed exposures, was made in the M.I.T. Alumni Pool, using flash equipment developed by Professor Edgerton of the Department of Electrical Engineering.

THE TECHNOLOGY REVIEW

Vol. 52, No. 6

April, 1950



The Trend of Affairs

The Shadow of Coming Events

As a result of studies conducted in the Testing Materials Laboratory of the Department of Mechanical Engineering, it is now possible, for the first time, to determine how close to the breaking point a piece of steel is as a result of its past history of intermittent loading. The fact that the approach to fatigue failure can now be anticipated, from direct measurements on a metal part, has tremendous engineering significance and importance. The new knowledge which this research has uncovered enables determination of the useful life of steel structures in those cases in which it is possible to obtain a sample for test purposes. In addition, it throws new light on the physical properties of metals. The studies, conducted under the direction of Professor Charles W. MacGregor of the Department of Mechanical Engineering, with the assistance of Nicholas Grossman, 9-46, Assistant Professor of Mechanical Engineering, led to the discovery of a hitherto unsuspected relation between fatigue failure and the tendency for the metal to fracture at a relatively low temperature. The discovery of this new relation is an outcome of a new method of testing steel specimens in bending throughout a wide range of temperatures.

When a material is stressed intermittently for a large number of times, it will eventually fail under a much lower stress than it could normally support if the stress were applied continuously. This type of failure, called fatigue failure, is responsible for many breakdowns of machinery parts. The changes that occur in the metal, as it is stressed through a number of cycles, are not well understood and have not been measurable in any quantitative way.

The new method of measurement depends on the fact that there are two ways in which a metal may deflect before it breaks. According to Hooke's law, the bending deflection of a ductile steel specimen will be

proportional to the applied load, so long as the load is relatively low. That is, within the elastic limit of any body, the ratio of the stress to the strain produced is constant. When the elastic limit is approached, plastic flow of the material occurs and the deflection increases more rapidly than the applied stress. If specimens are tested at progressively lower temperatures, plastic flow progressively decreases so that ultimately a temperature will be reached for which Hooke's law applies right up to failure of the specimen. This type of failure is called brittle fracture, and the highest temperature at which it occurs for a given shape of specimen and strain rate is called the brittle transition temperature.

A new type of testing machine has been developed at M.I.T. to determine brittle transition temperatures. This machine permits loading a specimen in simple bending at a given uniform speed and at any temperature from that of the room to that of liquid air, —300 degrees F. The load-deflection history of the test is automatically recorded during tests. A series of tests are made with identical specimens at the same deflection rate but at progressively lower temperatures until a straight load-deflection curve indicates that the brittle transition temperature has been reached.

Recently, this machine was used to determine the brittle transition temperatures of steel specimens that had been subjected to various numbers of cycles of intermittent stresses on a standard fatigue testing machine. It was found that the brittle transition temperature increased as the number of stress cycles was increased and, furthermore, that the extrapolated brittle transition temperature coincided with the metal temperature when fatigue failure occurred. It was possible to detect an increase in the brittle transition temperature even when specimens had only been stressed 1 per cent of the number of cycles required for fatigue failure, thus providing ample warning of the approach of fatigue failure.

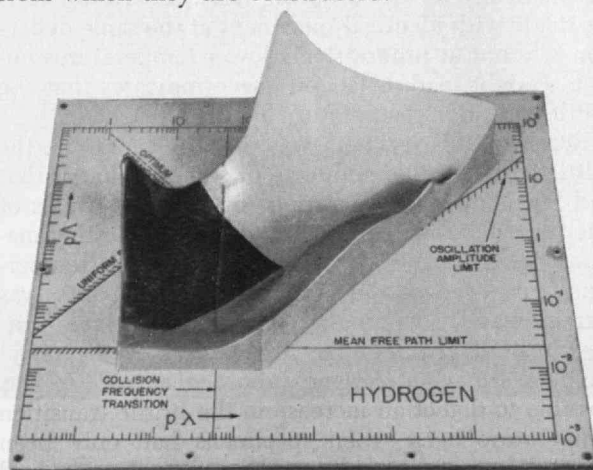
Model of a Breakdown

BECAUSE of its bearing on radio and radar, a clear understanding of the voltage breakdown occurring at high frequencies is of very great practical importance to electrical engineers as well as to physicists. Former studies of sparking voltage, at frequencies of several million cycles per second, had produced so many obscure and apparently conflicting results that progress in this field had virtually come to a standstill. In the Institute's Research Laboratory of Electronics, a group of physicists, under the direction of Sanborn C. Brown, 10-44, Associate Professor of Physics, have developed a new and simple theory to account for the complicated phenomena which are observed.

The new theory is simple, stating merely that, within a large experimental range, electrical breakdown will occur whenever electrons lost by diffusion from an electrical field are balanced by those produced by ionization. This line of reasoning has been proved valid well beyond the limits of the particular investigation, and thus gives promise of having far-reaching importance. The theory was derived mathematically from elementary principles, and was checked experimentally in the laboratory for discharges in hydrogen, helium, and air.

On the basis of this recently developed theory, alternating current breakdown of gases may be described by three distinct relations which can be plotted on paper, although the physics of the problem is more easily visualized by constructing a three-dimensional model whose surface represents the required data. A photograph of such a model, for hydrogen gas, is shown below. This model is constructed using all data which can be assembled from the studies in high-frequency electrical breakdown of hydrogen gas. It is based on work done over the past 20 years by many investigators in many countries, and covers a wave-length range of from 10 to 6,000 centimeters in tubes of many shapes and sizes.

In systematizing a great deal of data, much of which had previously been regarded as conflicting, M.I.T. research workers have an excellent example of the axiom that the generalizations of science, once found, are simpler to describe than the heterogeneous data from which they are constructed.



Three-dimensional plaster model whose warped surface represents experimental data on microwave gas discharge.

Radioactive Piston Rings

WITH the use of radioactive piston rings, studies are now being made of the metal transferred to the cylinder walls of a small water-cooled, internal-combustion engine. Metal transfer has been found to occur under the mildest conditions of engine operation, including motoring with the engine cylinder head removed. In fact, the quantity and distribution of the material transferred seem to be independent of the cylinder pressure, nor does it appear to depend on whether or not the engine is fired. It is believed that the transferred metal may play an important part in the formation of the glazed surface layer that is characteristic of cylinder walls and rings in well-run-in engines. In any case, it is an indication that the piston rings are not completely separated at all times from the cylinder walls by an oil film.

The studies are being carried out under the direction of John T. Burwell, Jr., '34, Associate Professor in the Department of Mechanical Engineering, and are supported by the Chrysler Corporation. A small single-cylinder test engine in the Sloan Laboratories for Aircraft and Automotive Engines is being used for this purpose. The piston rings are prepared by plating their surfaces with radioactive chromium obtained with the approval of the Atomic Energy Commission. Before each test, the cylinder is lightly honed and lapped to produce a surface finish typical of a new engine. A test run usually lasts for seven hours, after which time the engine is stopped and torn down. The cylinder barrel is degreased thoroughly and then strongly scrubbed with cotton waste to insure that loose particles or debris have been completely removed from the surface. A sheet of x-ray film, rolled into cylindrical shape, is then pressed against the cylinder wall by means of an inflated rubber bladder. After an exposure time of from two days to two weeks, the film is developed simultaneously with a control film which has been exposed to a known amount of radioactive chromium.

So far, the films have all been very much alike in appearance. Dark regions in the negative, indicating the presence of radioactive chromium, are present along the entire piston stroke, but the greatest darkening occurs at each end. This concentration pattern corresponds to the wear profile observed in engine cylinders by other workers. Although the rings are free to rotate, sets of closely spaced lines are visible on the films. Presumably, such lines are caused by the ring tips when the ring remains in one position for a considerable period of time.

In addition to providing new insight into the mechanism of wear in engine cylinders, these tests further substantiate the current hypothesis of one cause of friction between solid surfaces. Very minute welds or adhesions are believed to be formed on the isolated areas of true contact. These welds are broken and new ones formed when sliding occurs. The strength of the welds is indicated by the fact that the radioactive chromium could not be removed by brisk and repeated scrubbing with solvents and paper towels but required honing with an actual abrasive.

Up to the present, the experimental technique has limited the tests to "running in" conditions of engine

operation. By irradiating a run-in piston ring and then replacing it in its engine, observations are being made of the metal transfer which occurs after an engine has been run in.

60,000 Horses

LARGE supersonic wind tunnels have been proposed, having power requirements in excess of 100,000 horsepower. A supersonic wind tunnel is simply a device for accelerating an air stream to the required velocity. The air stream is subsequently decelerated to save power. It is relatively easy to accelerate a stream of gas in a nozzle to supersonic velocity with very good efficiency. The reverse process, that of decelerating a supersonic stream, is very difficult to accomplish without large pressure losses. These losses are largely responsible for the extremely large power requirements of supersonic wind tunnels. If the losses can be reduced by one-half, the power requirement of a wind tunnel is reduced by almost the same amount. The process of decelerating a gas stream is called diffusing, and the device in which such deceleration occurs is called a diffuser.

In the Gas Turbine Laboratory, a new type of diffuser has been developed by Ferdinand Lustwerk, '42, research associate, under the direction of Ernest P. Neumann, '38, Assistant Professor, both of the Department of Mechanical Engineering. This diffuser promises to bring about a significant improvement in the efficiency of the diffusing process. Present diffusers, used with wind tunnels having a speed of two and one-quarter times the speed of sound, are approximately 65 per cent efficient. The new type is about 87 per cent efficient under these conditions. Application of this diffuser to a wind tunnel of the speed described would mean a saving of approximately 60 per cent of the power required. Since this means a saving of about 60,000 horsepower in a tunnel having a normal requirement of 100,000 horsepower, the new type diffuser, which so far has been tested only at small scale, may offer some important savings.

One of the characteristics of a supersonic diffuser is that the shape best suited to initiate flow is not an efficient shape for operation once flow has been established. The new diffuser has movable walls which make it possible to approximate the most efficient shape for running conditions, as well as to obtain a shape suitable for starting. The idea of a variable geometry diffuser is not new, but the configuration of the new design gives higher efficiency than has previously been obtained. Plans are now being made to conduct tests to ascertain the value of the device for inlets to power plants for supersonic aircraft.

As shown in this illustration, the diffuser consists of a converging approach section, connected to a diverging outlet by a relatively long straight section, the latter of which constitutes an important improvement.

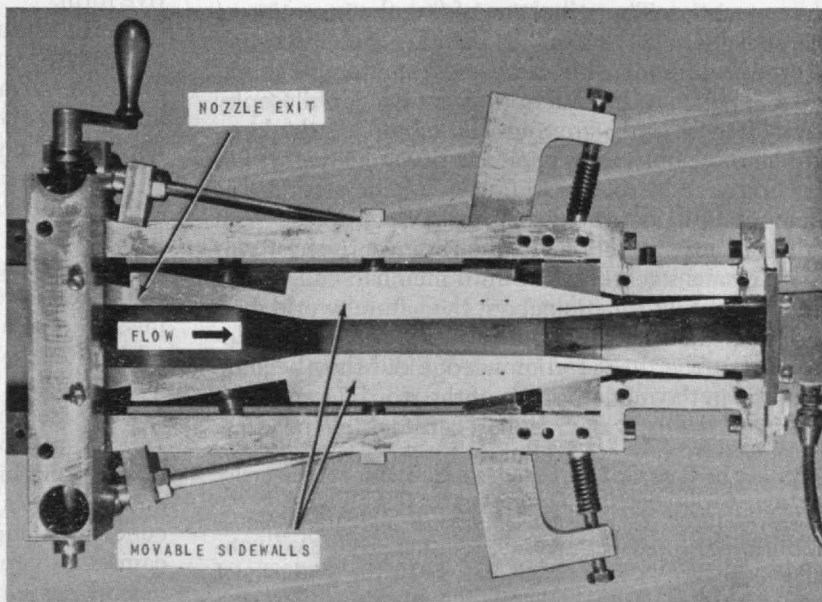
New Use for Acoustics

RECENTLY, a new nondestructive method of testing adhesive joints connecting steel rods has been developed, based on the principle that the acoustic resonance properties of the joined rods change as their joints deteriorate. At present, the method is limited to the testing of joints between rod-shaped materials that are good conductors of sound. It appears likely, however, that the principle can be applied to other types of specimens and eventually may provide a routine method of inspecting many glued joints. The present technique can be of direct value for use with test specimens in monitoring conditions for curing other adhesive joints.

The method was developed in a general program for the study of adhesives which is sponsored by the Ordnance Department of the Army, and is directed by Albert G. H. Dietz, '32, Associate Professor of Structural Engineering, and Herman P. Meissner, '29, Associate Professor of Chemical Engineering, as a cooperative movement of the two Departments.

After being carefully aligned axially, two steel rods, three-eighths inches in diameter and two inches long, are glued together using a phenol formaldehyde-polyvinyl butyral glue. After a suitable curing process, the glued rod is mounted in the acoustic-resonance testing device. Longitudinal driving forces of various frequencies are supplied to the rod, and the resultant amplitudes of vibrations are measured. In this manner, the amplitude vibration of the rod may be plotted as a function of the frequency. When the internal damping is low, the amplitude-frequency curve will rise steeply to a peak value at the resonant frequency. With more internal damping, however, this amplitude peak will be less steep and will spread over a wider frequency range. The width of the resonant frequency band, therefore, provides a measure of the internal damping of the rod. By comparing the measured resonant frequency band widths of the glued bar with those of a continuous bar of the same length, formulas have been derived to obtain an effective value of Young's modulus and a viscous modulus

(Concluded on page 342)



American Education in a Quandary-I

Some Thoughts are Presented on the Important Question:

"How Can Modern Man, in One Short Lifetime, Learn to Live and Also Learn to Make a Living?"

BY C. C. FURNAS

THE human race, civilized or not, has always existed in an atmosphere of struggle, frustration, and indecision. Since the beginning of *genus homo*, groups of men and women have been faced with starvation, disease, inadequate shelter, disaster, animals, and other men as enemies. They have been handicapped in their struggles by ignorance, prejudice, hatred, physical debility, mental inertia, and stupidity. Despite all this, man has, over a period of a few thousand years, succeeded in completely changing his lot and, occasionally, had an enjoyable time doing it. He has made substantial headway in adapting himself to his earthly environment and remarkable progress in shaping his terrestrial domain to his desires and physical needs.

If, 10,000 years ago, bets could have been placed on the ultimate achievements of certain harassed, and probably filthy, bands of two-legged mammals, the odds would certainly have been stacked heavily against these unhappy men and women who were our forebears. They were devoid of claws and fangs and inadequately protected against the weather. Their only asset was a disproportionately large brain case, well filled with gray matter. Intellectual processes — application of rudimentary logic, mixed with occasional flashes of genius — came into play with such effectiveness that man now completely dominates the globe and largely bends it to his will.

Human beings have been able to achieve this really remarkable physical progress because man has always been a researching animal; that is one of his distinctive characteristics. The utilization of fire, the invention of the wheel, of weaving, of the planting and harvesting of crops represent some of his earliest attempts to improve upon nature. There was no fixed philosophy back of these early gropings, no organized thinking, no planning, only an innate curiosity, a willingness to "try and see," coupled with a vague understanding of some relations between cause and effect, spiced with a rudimentary ambition. This early inventiveness was by no means scientific. Not until men had collected a great deal of information about the natural world, had perfected their processes of pure reasoning, and developed a true thirst for knowledge did they become scientific in the modern sense of the word. Despite the crudity of the early approaches, considerable progress

was made, because the application of even the most elementary knowledge was almost certain to be relatively fruitful. A very small amount of gas will relieve a high vacuum. The organized sophistication which characterizes our present-day approach to physical phenomena would hardly have been fruitful in those early days. Modern science would have been too complicated. Simple developments came first as the necessary foundation for growth.

The Role of Education

Education, in an elementary sense, was obviously a necessary part of the evolution of civilization and society. Some form of spoken language was undoubtedly employed early in the game, to instruct the younger generation in the lore, rules, skills, and perhaps even some thoughts that the parents had acquired. Even as today, the process was probably reasonably well diluted with a considerable amount of mumbo jumbo and other extraneous material.

Yet this handing-on process for the education of the young is not unique with man. Animals, even of rather low cranial capacity, do quite a bit of it. The robin teaching the fledgling to fly, by fluttery example, is an "every spring" pedagogical process we can all readily observe. Much more dramatic is to see a mother bear teach her cub to ascend a tree upon the approach of danger. The maternal paw placed upon the cubby rear, in forcible impact, is a fine example of education at its swiftest, and perhaps in its most effective form.

Obviously man incorporated something more than the iterative processes in his education or he would not have advanced. That something new which was added was the product of his crude researches. Perhaps once a generation he learned, by accident or otherwise, something new about the natural world or some new trick of the trade of living and succeeded, in some way, in transmitting that new research result to his progeny. Thus the essentials of a university — the acquisition of new knowledge, and the transmission of available information to the young — were undoubtedly well established in the lives of the Neanderthal and Cro-Magnon men.

Life, and hence the educational processes, were very simple for the many generations that were concealed from history. With the evolution of symbolism and its logical product, the written word, and the concept of numbers with its own symbolism, life became quite appreciably more complicated. The business of passing on accumulated knowledge and skills

Certain portions of Part I of this article also appear under the title "Civilization in a Quandary" by C. C. Furnas in the February, 1950, issue of *School Science and Mathematics*. Such material is republished here, with the permission of the author and Glen W. Warner, editor, to retain the continuity of thought which Dr. Furnas brings to this article.

grew beyond the normal parental capacity and specialists of instruction — the teachers — arose. Thus formal education evolved. Specialists, even as now, were probably hard to find and were expensive, so education in the sophisticated world of, say 2000 B.C., began to be limited to those in a privileged economic status; those who had the money to pay and the leisure to absorb.

My suggestion that the first educators belonged to the moneyed class is not to be taken as an insinuation that they were the idle rich. That came later. The early educative efforts were undertaken for practical purposes. The scribes, priests, and rulers found education to be a necessary tool to attain or maintain a professional or economic position above the unschooled rabble who toiled and strained for their unattractive existence. The learning which was necessary for the trades and the practical arts, such as they were, was acquired by mere observation of the elders and by informal apprenticeships.

As generations passed, life became more sophisticated and men found that education was potentially something more than a tool for making a living; it could add appreciably to one's ability merely to enjoy life. Thus arose the tradition, the way of life if you choose, described as the pursuit of knowledge for knowledge sake. It gave substance and form to man's innate curiosity and was the source of the really great advances in knowledge and learning.

Not unexpectedly, but also unfortunately, an element of severe smugness crept onto the scene. Knowledge to be pure must not be sullied with any suggestion of application or practicality. The battle between the pure and the applied was waged in many places and over many centuries, with the pure progressively losing some of their purity by contamination. Preparation for the professions was eventually accepted as a legitimate activity of the educational system, but only over many a dead scholastic body. As life has become more diverse and more complicated, more and more of the human activities that have to do with the business of making a living have entered the academic halls. Although the denizen of the ivory tower still exists and occasionally sputters forth in combat, the pitched battles between the pure and applied have now largely disappeared and have been displaced by a good, honest quandary, shared by all hands. Stated as simply as possible this quandary is: How can modern man, in one short lifetime, learn to live and also learn to make a living? Further analysis of the elements of the quandary would certainly appear to be in order. Perhaps such a studied inspection might lead to some suggestions for remedies.

Our Modern World

Many treatises have been written on the purpose of education, but there has never been any evidence of detailed unanimity of opinion on the subject. It is usually agreed, however, that education should have some relation to the world we live in, or hope to live in. Hence, it is not illogical to approach the subject by looking at the most important features of our existence. Not until we have a fair picture of the prime factors in life's present pattern are we qualified to pass

judgment on what education should or should not be.

During the present cycle of ebb and flow of peoples and nations, that entity which we choose to call Western civilization still holds the dominant position. In that ensemble of nations, America, whether it likes it or not, holds the key position economically, militarily, and politically. Whether America and even Western civilization will eventually pass into limbo is a moot question, for there is certainly no definite assurance that we will be able to do better than others have. But whatever the future may hold, the present discourse will be pitched to the thesis that our present civilization will be with us for some time to come.

American Genius for Production. Western civilization undoubtedly grew to its dominant position because of its mastery and use of science and invention. This is a basis for a world revolution which is far more significant than any ideological revolution which has ever occurred. The situation is summed up very neatly by Peter F. Drucker in an article in the *Harper's Magazine* for September, 1949, called "The New Society." Mr. Drucker states it this way:

The world revolution of our time is not communism, fascism, the new nationalism of the non-Western peoples, or any of the other "isms" that appear in the headlines; they are the reactions to the basic disturbance, secondary rather than primary. The true world revolution is "made in U.S.A." and its principle is the mass-production principle. Nothing ever before recorded in the history of man equals in speed, universality, and impact the transformation that modern industrial organization has wrought in the foundations of society in the forty years since Henry Ford developed the mass-production principle to turn out the Model T.

Mr. Drucker then goes on to point out that the revolution of mass production is not merely a matter of standardized physical operation and machine tools, it is a whole philosophy of organization involving the close integration of the work of specialists, whether they be producing mechanical goods, chemicals, newspapers, or personal services. The important aspects of the revolution involve the organized integration of the efforts of teams of people rather than merely the tools with which they work.

The validity of Mr. Drucker's argument can well be seen by comparing the physical standard of living in modern America with that of other countries of the world which presently live under the older technical regimes; or by a simple comparison of the present with the beginning of this generation in this country. The importance of the development, however, is not confined to mere conveniences and comforts and the ability to do more things in less time. Its impact on civilization is and has been far more dramatic than mere individual gains. Probably most outstanding has been the effectiveness of the United States participation in two World Wars. In both cases, America came onto the scene late and each time threw the "Sunday punch" which led to victory. The deciding factor was not as much a matter of military genius, or bravery, or even numbers of men, but the tremendous quantity of matériel "made in U.S.A.," which was thrown into the conflict: the ships, the guns, the trucks, the airplanes, the whole array of armament which simply crushed

the enemy by the steam-roller process. The link between industrial productive capacity and the road to victory was demonstrated beyond any doubt.

Communication and Travel. The transportation of people, things, and ideas has always been one of the major activities of the human race, bounded only by the limits of the accessible world itself. Automobiles, movies, radio, and finally as a grand climax, the airplane have supplemented and, in many cases, have replaced the older means of carrying on this activity. The impact on our way of life has been terrific, not only because of the increased quantity of men, things, and ideas which are transported, but even more because of the great condensation of the time interval that is involved. This gives us more goods and services where and when we want or need them, but it also acts to sharpen up the conflicts which are inherent in our social structure. If the Aztecs of South America had any basic quarrels with the Spaniards, it didn't matter prior to the Sixteenth Century, because neither group knew that the other even existed, and no conflict was possible. But even the crude means of transportation that Columbus used were instrumental in bringing about an ultimate, devastating conflict between these two peoples. Today a political conflict on the other side of the world may have some direct or indirect effect upon us within a matter of hours. No corner of the earth is now remote from the ways and means of quickly transporting the ideas and the implements of war as well as those of peace. Once, time was a great healer of many ills. Now, there simply is not enough time for it to act in therapeutic capacity.

Agricultural Productivity. In 1787, the year our Constitution was framed, the surplus food produced by 19 farmers in this country went to feed one person residing in a city. In recent average years, 19 people on farms have produced enough food for 56 nonfarm people, plus 10 living abroad. Thus in a little more than a century and a half, the ability of the farmer in this country to produce surplus food, over and above his own needs, has increased by over 6,000 per cent. The dramatic impact of this trend is well known, resulting in the shift from the strictly agricultural economy to one which is predominated by industry and commerce. The difficult sociological and economic problems which have been occasioned by this change, even though it has been gradual, are certainly well known. My own opinion is that the change has been definitely beneficial, looked at from any angle, but there is no gainsaying the fact that it has been the source of many problems in the matrix of conflicts which are so characteristic of modern society.

The Biological Sciences. Public appreciation of the beneficence of the application of the biological sciences, including medicine, seems to be dulled, probably because the success is measured by what doesn't happen rather than what does. In this country we now consider it to be normal and expected that the average child shall be reared with only a modicum of minor ailments, and seldom any really serious disease. It is anticipated that he will grow to adulthood without any grave physical handicaps. Not many genera-

tions ago this happy state of affairs was something that was prayed and hoped for but which, on the average, was not really expected to happen. As reflected in rather unimaginative vital statistics, the expectancy of life at birth a few generations ago was of the order of 30 years; now the expectancy of life at birth in this country is over 65 years for women and somewhat less than 65 years for men. The principal gains have been in lessening the hazards of life for infants and adolescents, but now, with the availability of antibiotics such as the sulfa drugs, penicillin, and so on, the improved knowledge of nutrition, biophysics and biochemistry, and the artificial utilization of hormones, the life of the middle-aged and even the aged has been lengthened. The battle is being seriously joined with the degenerative diseases such as cancer, diabetes, and a series of heart ailments, so that our present really excellent health record should be substantially exceeded in the future. We are already coming close in average performance to the Biblical three score and ten which was probably thought of as the ultimate span of life.

Obviously this is all highly desirable and of great benefit to those of us who are privileged to be alive. However, even this has its dark side. Overpopulation in certain spots of the world has always been a problem. The gloomy predictions of the English clergyman, Malthus, that the world must limit its population or soon come to the point of starvation have had their ins and outs of popularity. Frequently when complete saturation of the population of the world has appeared to be at hand, new techniques of producing food, goods, and services have come to raise the practical population limit. Now, however, the effectiveness of medical science in preserving lives is making the problem more and more serious. We are continually thwarting nature in the use of her natural methods of decimating biological species that overpopulate themselves and yet are making no effort, in the world-wide sense, to place any limitations at the source. We cannot long disregard this unbalance of nature without running into some insurmountable problems.

In my opinion the world is already overly populated, in the sociological sense. Mere physical crowding leads to many mass psychological conflicts which can probably only be solved by avoiding them. On the nutritional side, the situation is equally serious. It is quite likely, even now, that two thirds of the people of the world are malnourished because of lack of sufficient food, and fully one third, at all times, live on the fringe of actual starvation. Although the use of modern agricultural methods probably can increase the amount of food produced in the world, there is a limit to the productivity of the soil and it would appear from the most recent surveys that we are not far from that limit now. For physical as well as psychological well-being, we are probably already at, or beyond, the saturation point for a really decent standard of living. Hence, the very effectiveness of the altruistic work in the application of the biological sciences brings on its own quandary, for we still seem to be holding onto the archaic idea that continuously increasing the population of the world is a virtue in it-

(Continued on page 334)

The Ceramics Art

Empiricism and the Potter's Wheel Are Giving Way to Science and to Quality Mass-Production Methods

BY FREDERICK H. NORTON

CERAMICS, one of mankind's oldest arts, has been profoundly changed by impact with the scientific age. No longer is industry satisfied with secret formulas handed down from father to son, but rather inquires as to the basic principles underlying the various processes and thereby is enabled to advance in well-defined steps to better end products. Under these conditions there is a demand for well-trained men in the ceramic industry, men with a good basic foundation on which to build more specialized knowledge. Not only are men needed with a ceramic background, but to make full use of the manifold possibilities of clay in the potter's hands, such men must also have a knowledge of the related subjects of physical chemistry, colloids, machine design, mineralogy, ore dressing, and mining methods.

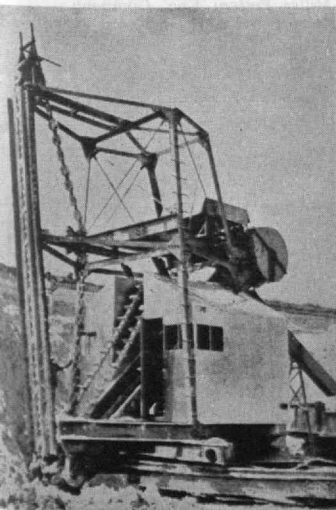
As in other fields of technology and engineering, it is difficult to carry specialization very far in a four-year course, but in graduate work there is time for a thorough training in the broad field of ceramics. In this country there are at present 20 colleges giving degrees in ceramics, turning out each year approximately 250 men with a bachelor's degree, 60 men with a master's degree, and 35 acquiring the doctorate.

Here at M.I.T., we have never had undergraduate work in ceramics, preferring to concentrate all of our efforts in the advanced field. For this reason, a large proportion of the men receiving the doctor's degree in ceramics in this country have come from Technology and taken leading positions in the fields of education and industry.

Ceramics is a broad field, covering as it does, glass, cements, whitewares, building products, enamels, refractories, and abrasives. The annual business amounts to a billion and one-half dollars; but what is more important, ceramic articles are indispensable in the production of life's necessities. No steel could be produced without refractories; modern communication would be impossible or quite different from its present state if it were not for porcelains and glass; and machines could not be fashioned to make other machines if we lacked abrasives. In recent years several developments have come about in the industry to make ceramic products better or less expensive, or to extend the use of ceramics into new and important applications. Some of the more significant trends will be described, for progress in technology and mass-production methods have catapulted the industry into an era having no resemblance to that when the foot-operated potter's wheel was the "last word" in progress.

All ceramic processes start with the raw materials, the most important and oldest of which is clay. Not many years ago clay was mined by pick-and-shovel methods, but now the most modern equipment is used. Power-driven machines, such as the rubber-tired bulldozer shown in Fig. 1 and the power scraper in Fig. 2, now enable one man to handle hundreds of tons a day instead of hundreds of pounds, as was the upper limit so long as man power was the major source of brawn. In another case, clay is mined by an automatic planer, Fig. 3, which cuts the clay up, mixes it in a tank with water to form a liquid slip, and then pumps it through

Fig. 1 (right). Replacing hand labor of an earlier year, a rubber-tired bulldozer is today used in stripping clay. Fig. 2 (center). A power-driven scraper gathering clay. Fig. 3 (left). An automatic clay planer working in a bed of pure kaolin.



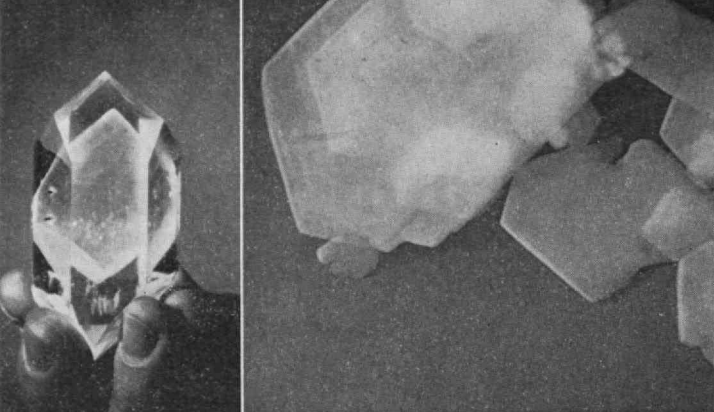
Eagle Iron Works



R. G. Le Tourneau, Inc.



R. G. Le Tourneau, Inc.



W. East

Fig. 4 (above). The basis of clay. Kaolinite crystals magnified 25,000 times by the electron microscope. Fig. 5 (left). A synthetic quartz crystal, important in communication applications, as grown in the Bell Telephone Laboratories.

Bell Telephone Laboratories

a pipe line several miles to the plant. Compared with the former method of loading trucks with a power shovel, the new method both saves labor and produces a more uniform product. In fact, so great have been the strides in efficient mining methods that even with a great increase in labor costs, the consumer pays no more for a ton of clay now than he did 30 years ago.

In Fig. 4 kaolinite crystals, the basis of clay, are shown as greatly magnified by the electron microscope. The natural clay, as mined, contains impurities such as sand and mica flakes which must be removed before it can be used for fine ceramics. The older methods of purification consisted in flowing a dilute water suspension of the clay through long troughs containing riffles to settle out the larger particles — a slow and cumbersome process. Recently much clay has been refined by passing the suspension through a continuous centrifuge whereby a rapid separation is possible. It was soon found that greater improvements in the clay could be arrived at by passing the refined suspension through other centrifuges at higher and higher centrifugal forces, thereby separating the clay particles themselves into finer and finer size classes. Therefore a consumer who wishes a fine grained clay for strength may specify a size fraction ranging between 0.5 and 1.5 microns and will feel sure that ship-

ment after shipment will be uniform. In other words, the consumer can now demand a "tailor-made" clay specified as to the grain size and mineral type.

Another type of ceramic raw material is feldspar — aluminum, potassium, silicate — that serves as an inexpensive source of water insoluble alkaline flux in whiteware bodies, glasses, and glazes. By means of modern processing equipment, the producers now supply a material of a remarkably constant analysis from what was a rather variable product. The feldspar rock is quarried by usual methods, crushed to the size of sand, passed through a high-intensity magnetic separator so powerful that not only is the metallic iron removed, but also all iron minerals as well. The cleaned material is then ground in huge pebble mills to a powder so fine that it passes a 325-mesh screen.

Silica, in the form of quartz, is one of the more important ceramic materials. Fortunately it is found in nature of high purity, both as rock quartz and as sands. One of the most important uses for silica is in the making of glass where it forms about three quarters of the batch. For this purpose, sand of high purity is required — often with less than 0.02 per cent of iron oxide — to produce optical or crystal quality. This country has excellent deposits of glass sand.

Silica brick, used in the roof of the open-hearth furnace for making steel, is made from a quartzite containing 98 per cent of silica. Only with this high purity is the silica brick able to withstand the fierce heat of the steel-making operation without melting. Recently super-duty silica brick has been made by washing the quartzite to increase the silica content to 99.5 per cent.

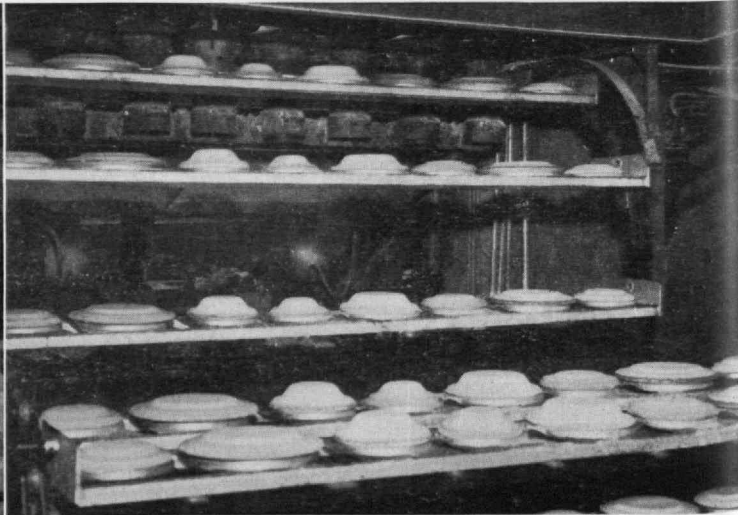
Silica, in the form of a fine powder, is an important constituent of white pottery and of porcelain bodies. It acts as a skeleton to hold the shape of the piece during the firing period where the less refractory clays and feldspars soften. Silica in a fine ground form is also one of the important constituents of glazes for pottery and enamels for metals, as it is the important glass-forming element.

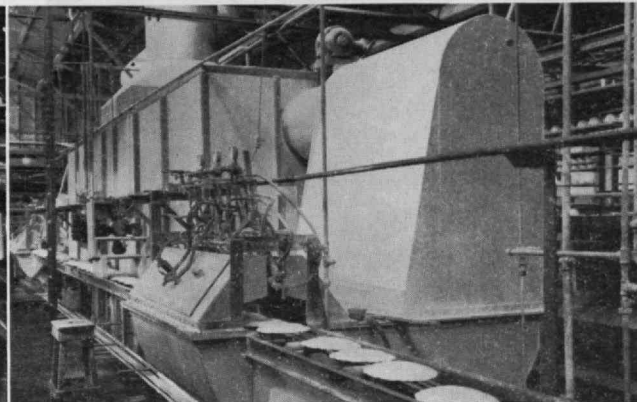
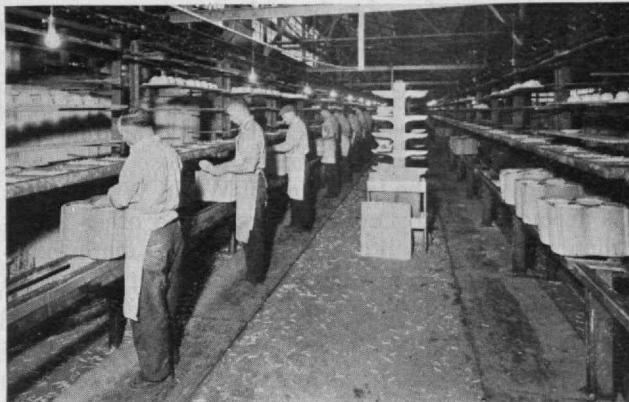
Pure crystal quartz is the raw material from which clear fused quartz utensils are made. The quartz crystals are also used in great quantities as plates in the oscillator of the communication system. So scarce are the perfect natural crystals needed for this purpose

Fig. 6 (left). A highly skilled team making dinner plates by hand jiggering. Fig. 7 (right). An automatic jigger forming dinnerware.

Homer Laughlin China Company

Miller Pottery Eng. Company





Homer Laughlin China Company
Fig. 8 (left). The "iron horse" where workmen move with their work as they place dinnerware in saggers ready for firing. Fig. 9 (right). Machine for automatically spraying glaze on dinner plates.

that great efforts have been made by various research organizations to grow them under controlled laboratory conditions. Already promising results have been obtained, as shown in Fig. 5; so we are no longer almost completely dependent on Brazil for quartz, as was the case at the beginning of World War II.

In addition to the more common ceramic materials mentioned above, considerable amounts of magnesia and chromite are used by the refractories industry as a furnace lining. One of the important sources of pure magnesia for refractories is sea water, which is evaporated in huge ponds both on the Pacific Coast and along the Gulf of Mexico. Unfortunately, we have no good deposits of chromite in the United States and must depend entirely on imports.

The electrical industry is interested in high purity talc and titania for special porcelains — materials that are now available in sufficient quantities. For special refractories, the rarer elements are in demand, such as zirconia and beryllia. Both of these materials must be imported to a large extent. And of course the refractories, thoria and uranium oxide, being fissionable material, are restricted in their use.

The whitewares industry, responsible for producing our tableware, has made little change in composition of either body or glaze in the last 10 years; but it has made great strides in developing labor-saving machinery, so that our industry may compete with the foreign producers using low-cost labor.

Until recently, the manufacture of pottery has been a highly specialized art. For example, the forming of plates on the "jigger," a plate-making machine, comprises the making of a pancake shaped piece of clay, the bat, and slapping this down on a plaster mold which revolves on a vertical shaft. As the bat turns, a tool is brought down by hand to form the surface of the plate. This is a seemingly simple operation, as illustrated in Fig. 6, but years of training are required to develop a good jiggerman. A jigger crew of three men can turn out about 200 dozen pieces in eight hours.

The opinion was long held by potters that no machine could be developed which would reproduce this delicate hand operation. But several independent developments, both here and abroad, have produced truly automatic jiggers that not only vastly increase production but simultaneously also produce a more uniform product. In productive capacity, a single machine is apt to yield the whole production of a plant

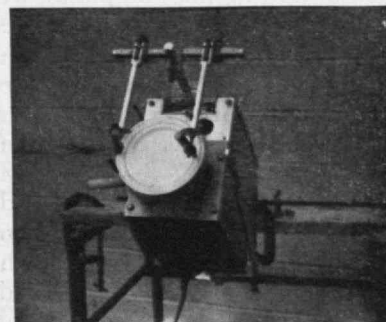
(10,000–20,000 dozen pieces a day) and at a cost far less than when hand labor was an important factor. A modern automatic machine is shown in Fig. 7.

In the modern pottery industry much has been done in the way of moving ware from place to place. Not many years ago stacks of plates or cups were placed on long boards and these boards were carried from place to place on the workers' shoulders, a feat requiring the dexterity of a waiter on a dining car. Then after the raw ware was packed in clay boxes, these were carried, one at a time, on the heads of the workmen, to the kiln — often up steep ladders. Now the ware is handled on conveyers and each worker remains in one place with everything brought to him and carried away. The heavy clay boxes of ware are moved by conveyor to the kiln, and in some cases, moving floors carry the workers along at the same rate as their work, as shown in Fig. 8. In a sense, the pottery industry has taken a leaf from the belt-conveyor method, which has been so effectively used in the automotive industry.

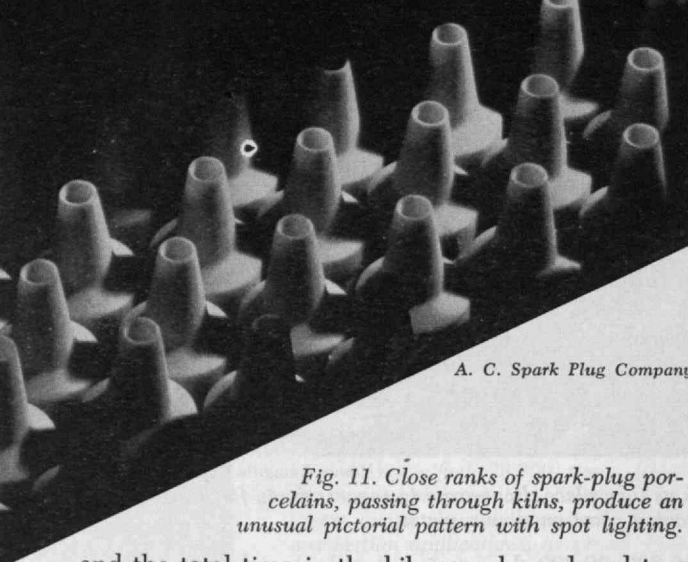
Formerly the firing in the pottery was carried out by stacking the ware in clay boxes or "saggers" in the huge space of the bottle-shaped kiln associated with the old potteries. The firing was by coal or gas burned at the bottom of the kiln to slowly raise the temperature to the correct level. A week or even two weeks was required to complete a burning cycle, and even at the best the temperature was not by any means uniform from place to place in the charge.

On the other hand, the modern pottery keeps a long tunnel-like kiln hot continuously with a temperature varying from cool at the ends to hot in the center. Through this tunnel are slowly passed a procession of refractory cars on which the ware is stacked. Each car will then receive the same heat treatment as the next,

Fig. 10. Machine for putting lines on the rims of plates. This operation is one in which hand work is now being replaced by machine operations.



Schweitzer Equipment Co.



A. C. Spark Plug Company

Fig. 11. Close ranks of spark-plug porcelains, passing through kilns, produce an unusual pictorial pattern with spot lighting.

and the total time in the kiln may be reduced to as little as eight hours. Rather than stack the ware in the cumbersome saggers, it may now be placed in light refractory shelves, allowing much more ware to be stacked in a given space. In addition, as the ware is continuously stacked in one place and drawn in another, the handling labor is greatly reduced by using the tunnel kiln. As the tunnel kiln is fully recuperative, the fuel used per pound of ware is only a fraction of that required by the old kilns.

Pottery is glazed by making up a finely ground water suspension of the glaze materials, such as lead oxide, lime, sand, and feldspar. A layer of this suspension is applied to the ware, in the older methods, by dipping each piece into a tub. However, this is a slow operation, and even skillful dippers find it hard to coat the piece uniformly. Therefore, the modern potteries have developed continuous glazing machines such as that shown in Fig. 9. Here the plates are passed rapidly through a spray booth where multiple nozzles spray an even layer on the bottom of the plates. An automatic handling device then turns them over and they pass through a second spray booth to have the upper surfaces glazed. This machine saves a large proportion of the skilled labor formerly used in glazing, and produces a more uniform glaze layer.

The hand decoration of pottery requires highly skilled labor, and the production rate is low. Except for high-priced ware, the decorating is now done mechanically either by spraying the color through a stencil, by applying decalcomanias, or with the modern silk-screen process. The latter, now extensively used, consists in forming a design on the stretched piece of silk with impervious varnish. The portions of the silk not varnished allow the special ceramic ink to pass through onto the surface of the plate. Even the operation of putting lines on plates, which requires highly skilled personnel, can now be accomplished with the very simple machine in Fig. 10, in which the plate is rotated while fixed arms apply the special ink.

Contrary to the pottery industry, the manufacturers of electrical insulators have made great advances during the last 10 years in new compositions. The standard electrical porcelain body is made of clay, silica, and feldspar. This serves quite well for low frequency use, but absorbs too much power in the high-frequency ranges required by modern communication systems. The magnesia containing porcelain, known

as steatite, was found to have the low loss properties as well as increased mechanical strength needed in electrical engineering. In some ways steatite is a more difficult body to fabricate than the feldspar porcelain, but these difficulties have been largely overcome, and shapes are now regularly made to close tolerances, especially since the beginning of World War II. This is accomplished by mixing the talc and other ingredients with a very little water to form a damp powder, which is then pressed in a steel die at a pressure of several thousand pounds per square inch. There is no drying shrinkage, and the firing shrinkage is uniform and predictable.

Another important development in electrical porcelains is the titania porcelains having very high dielectric constants, which permits the construction of compact condensers. Such materials have found application in hearing aids, proximity fuses, and in the small "printed circuit" electronic devices.

The scarcity of high quality, natural mica has led to extensive research for developing a method of growing these crystals, another example where science aids the ceramic industry. It has now been found that the phlogopite or fluorine containing mica can be grown from a melt cooled very slowly in a crucible. While much needs to be done before commercial production is possible, excellent crystals several inches across have been made. These have good cleavage and electrical properties that seem to equal the natural product. Another interesting development coming from this research are mica objects formed by hot-pressing the finely crystallized material in molds. The soft finished pieces can be machined to exact size.

Perhaps one of the most intensive developments lies in the field of spark-plug porcelains. Whereas the feldspar porcelain was good enough for the early,



A. P. Green Company

Fig. 12. A huge press in operation for the molding of refractory brick.

low-compression engines, the conditions now encountered in modern aircraft motors are very severe, and the older plugs will not stand up for any appreciable length of time.

The development of new materials to overcome earlier limitations has taken place in several stages. First, great improvement was shown by increasing the alumina content of the porcelain to produce an abundance of the aluminum silicate mineral, mullite. This formed in needlelike crystals that gave a reinforcement to the porcelain body greatly increasing the strength and toughness. Then porcelains of even better properties were produced from the zirconium silicate, zircon. But even this body was not equal to the demands of the modern aircraft engine so the latest porcelain is made from nearly pure alumina, sintered to a dense, nonporous body at exceedingly high temperatures, as shown in Fig. 11. While expensive to make, it proved highly successful during World War II. Now, the reciprocating airplane engine seems to be giving way to the jet engine, so that new problems confront the spark-plug manufacturer.

Some of the greatest technical advances in ceramics have occurred in the field of refractories during the last 10 years. For high temperature service in furnaces, the fire clay brick has been replaced by bricks higher in alumina content, shown during the pressing operation in Fig. 12, and after firing in Fig. 13. The blast furnace is replacing some of its fire brick with carbon blocks, and silica brick for the open-hearth furnace is now made in highly purified form.

A great deal of research is being carried out on pure, dense refractories in the form of crucibles for melting and refining metals, as blades in gas turbines and as parts for rocket motors. Certain portions of the nuclear reactor for power development require refractories of a very special kind for these uses. Not only have the stable oxides been considered, but also the borides, carbides, nitrides, and sulfides, all of which can be formed into a dense body.

In the producing of some of the new metals, such as titanium and its alloys, refractory crucibles are needed to resist the highly corrosive nature of this metal. While as yet nothing entirely satisfactory has been found, research is being carried out on this problem actively. A group of special crucibles made in the

Ceramics Laboratory at M.I.T. are shown in Fig. 14. These crucibles are made from the pure oxides, magnesia, alumina, zirconia, beryllia, and thoria. Great progress has been made in the Ceramics Laboratory at M.I.T. in producing this pure, nonporous ware by slip casting in plaster molds and firing in a special gas kiln up to 1850 degrees C.

Another high temperature problem that is now receiving much attention by various research organizations is the coating of metals to prevent oxidation; for example, steel may be protected with a high temperature enamel, or molybdenum, with molybdenum silicide. Some of these coatings seem promising, but they must be completely free from imperfections to prevent local attack. If a successful coating can be developed, it will have great industrial importance, for in many cases it will permit coated carbon steel to replace the high cost stainless steel for high temperature use; or it will permit the refractory metals, such as molybdenum, tungsten or tantalum to be used at high temperatures in air.

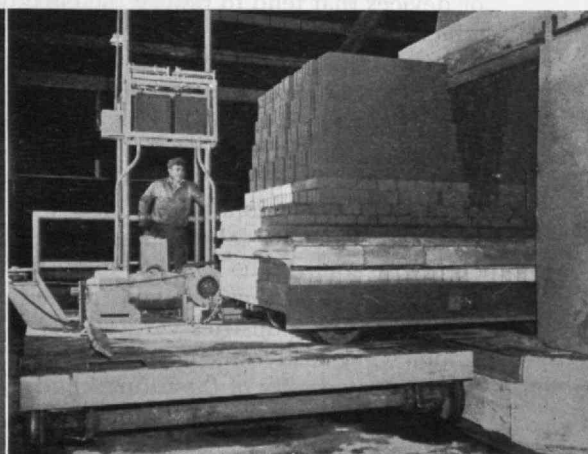
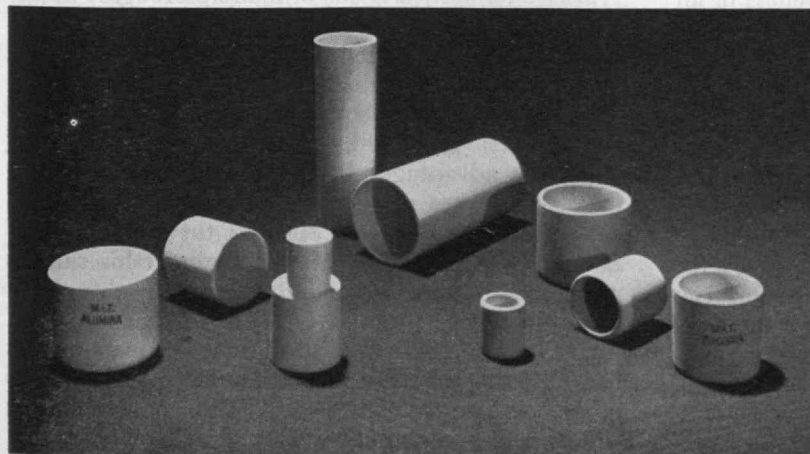
A class of materials comprising a combination of powdered metal and powdered refractory known as "ceramels" or "ceramets" is receiving a lot of intensive study to see if it is not possible for it to replace the expensive and highly strategic alloys used at elevated temperatures. It is hoped that a combination will be found possessing the ductility and temperature shock resistance of the metal together with the oxidation resistance and hot strength of the refractory. It is too early yet to know how far it is possible to travel towards this goal.

It will be seen from the preceding examples that the ancient art of ceramics has made more progress in the last 25 years than in all its previous history, due almost entirely to the efforts of the trained scientist who has applied himself to this field. Some branches of ceramics, such as heavy clay products have been rather slow in applying science to their problems, and as a consequence, have progressed slowly compared with competitive materials. However, within the last year this industry has raised a sizable fund and is in the process of formulating a broad co-operative program of research from which, I am sure, will come great benefits to this industry. Even the common building brick can be improved.

Fig. 13 (right). Fired refractories coming out of a continuous kiln. Fig. 14 (left). Nonporous refractory oxide crucibles made by the Ceramics Division for use in other laboratories at M.I.T.

M.I.T. Photo

Swindell-Dressler Corporation—Van Kan Pictorial Illustration, Inc.



Air Defense

Today's Instability in International Affairs Poses the Problem of Securing Adequate Preparedness within the Realm of Economic Solvency

BY ERVIN H. BRAMHALL

A TOUR through the Pentagon's numberless corridors will confirm the impression that warfare is now a community affair; for the odds are even that you will meet as many in mufti as in khaki — or as many of one sex as another. Any one of the daily and unending conferences is bound to be favored by the presence of at least one variety of scientist, expert, or lawyer. If one is the least bit impressionable he must needs be subdued by the formidable amount of thought (and money) from all sources that merge tangibly into a stream of paper, the fate of which is somewhat varied.

The foregoing introduction seems to be related only vaguely to the subject of air defense. It does indicate, however, that military planners are now confronted by problems that require attention from fields outside the scope of military science. This is particularly true in the area of continental defense in all its ramifications. And in recent years, the protection of domestic sources of military strength has become an element of considerable importance to military plans.

Air Defense

For the purpose of this discussion the term "air defense" is used to include all measures, whether passive or active, designed for defense against hostile aircraft or missiles in flight. In the former case, the objective is to increase the capability for absorbing the attack, and in the latter case, to levy toll on the weapon carriers. Although the definition excludes counterattack, this may still be considered as perhaps the most effective defense. Certainly the capability for retaliation would be considered a strong deterrent by a potential enemy.

Passive defense may be defined as "those measures or devices that tend to reduce the effectiveness of air attack." Certain physical artifices fall naturally under this definition — for instance, the use of camouflage (whether it be paint, netting, or other means) to make an inviting target merge into the environment or have it appear to be something that it is not. On a more sophisticated level, those ubiquitous electronic devices can, on occasion, be used in one way or another to give the enemy a false impression of his position or otherwise confuse the issue. As to other measures, the possibilities are numerous and fascinating. One can move cities or industries vertically or horizontally — a somewhat costly and inconvenient procedure, but perhaps a necessity of the future.¹ Social and psycho-

logical measures — such as civilian organizations for emergencies, and telling the citizen what he should know — all come under the present category. Actually this approach can be overdone; for almost anything from drinking a hot toddy (to bolster morale) to planting mushrooms in the basement (for emergency rations) can be construed as protective measures. And no mention has yet been made of air raid wardens, fire fighters, or countersabotage. One foresees a great future in this field during another war.

The heart of active defense operations is the collision problem which fortunately involves only three-dimensional space. An oncoming missile or missile carrier is to be met by some sort of projectile or missile capable of producing an effect inimical to its further progress, preferably before the target missile can produce any unwonted effects on its own account. There are three obvious choices as to the method used for delivering such a projectile: (1) it can be escorted personally in a piloted aircraft; (2) it can be equipped with a power plant and guidance system; (3) it can be launched from a gun. Three designations — air intercept, guidance, and gun problem — may be used to distinguish among the alternatives. All must have certain features in common, and in the interest of brevity only the gun problem is examined in any detail. There are, of course, more bizarre methods possible — with recourse to the inexhaustible resources of technology — for accomplishing the end purpose. For example, an electronic device capable of detonating the war head of a target missile, or else fouling its control system, would constitute a very attractive weapon.

The Gun Problem

Musca domestica is one of man's thoroughly objectionable enemies, and should be liquidated as soon as a favorable tactical situation arises. When air-borne he poses a rather difficult target, especially if, as is so often the case, an adequate weapon is not at hand. Even when grounded, his propensity for taking maximum advantage of terrain features and camouflage techniques renders him an elusive opponent. The stalker is faced with some of the same troubles that annoy the antiaircraft gunner, and his success will be determined in great part by the quality of his technique.

Early warning is essential. Without it one might just as well swing (or shoot) his weapon at random on the off chance that the target will fly into the lethal area. This is barrage fire at its worst, and, space being what

¹ Ralph E. Lapp, *Must We Hide?* (Cambridge, Mass.: Addison-Wesley Press, 1949), \$3.00.



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Early warning is essential . . .

it is, should ordinarily be discouraged as wasteful of energy. Just as the pitcher's windup enables the batter to time his swing, so does an effective early warning system provide advance intelligence on the nature, course, and speed of the approaching target, and thus gives opportunity of engaging it at maximum range. Radar provides the wherewithal if available in sufficient quantity; but the use of a supplementary system of spotters has attractions even in this electronic age, at least if the defended area is large.

The matter of aiming a gun at a target's future position — removed perhaps some three miles from its present position — poses some difficulties. The problem is essentially that of determining the target's location after a time equal to the time of flight for the projectile employed, plus the time necessary for the solution of the problem and for pulling the trigger. Time being at somewhat of a premium, automatic devices are relied upon to collect the raw data, feed it into a mechanical slide rule (still rather cumbersome for classroom use), and performing whatever action may be necessary.

After all this bother the target is like as not to veer off on a high-speed turn just as the projectile leaves the gun. The net result is failure to score even a near miss, and a loss amounting to the cost of one projectile plus wear and tear on both the gun barrel and the operator's morale.

It is evident that the collision problem becomes annoyingly complex when the target speeds and altitudes justify the imagination of science fiction writers. Needless to say the guidance and interception problems likewise have their headaches. Given a target approaching at 1,000 miles per hour and containing an unguessed number of tons of T.N.T., the necessity for using the optimum countermeasures — and quickly — is apparent, for only a few seconds may separate those on the receiving end from oblivion.

It is certainly impossible to provide either artillery or other protection that would appreciably help all areas that would constitute attractive targets for air attack. This fact is perhaps not generally realized, and is one that points in the direction of two countermeasures: (1) development of absorbing power through passive methods; (2) concentration of effort on the capability for counterattack on enemy bases

and sources, combined with improved intelligence on their vulnerability and criticality.

Either of these tends to inhibit exploitations of hostile air: the first, through increase in toughness of the target; and the second, through increase of ability to retaliate effectively.

Clearly in order to bring a war, which has once started, to satisfactory conclusion, it is necessary to build up a powerful striking force. This may take the form of superbombers, though in this connection there are still some who fail to see the light. There are, likewise, proponents of supertanks, guns, and so on, all at supercost in money, man power, and strategic materials. Top-level planners are then faced with painful decisions in allocating available effort. Not only must they decide on the relative strengths of offensive arms, but also on the proportion of the total effort that should logically be devoted to defense against possible threats.

On the Need for Defense

At the moment, any threat of attack by land or by sea borders on the insignificant, so that the problem of defending the continent is not as complicated as it might be. There may even be some doubt as to the effectiveness of any possible air attack. The fact that the much publicized radar fence has been authorized indicates that one or both of two opinions is held in high circles: (1) that a real threat of air attack against urban areas and industries exists; (2) that the radar fence will do some good.

The newspaper reader will agree on both, and mentally assign more of his taxes to the purchase of security. He may wonder, but cannot know, to what extent the various gadgets his money buys will help him live to a ripe (and soft) old age; or whether, after all, a ticket to the South Seas would not have been a better investment. To awaken some morning to find himself surrounded by atomic bombs would tend to weaken his faith in the planners.

The necessity for defense preparations, as far as the Continental United States is concerned, may be deemed extreme or nil, depending on one's ideas as to the potency of air power.



H. G. Miller

. . . the target is like as not to veer off on a high-speed turn . . .

The query, "Can air power win a war?" is equivalent to the question, "Can strategic bombing be decisive?" There are several possible answers: (1) Yes! (2) Yes? (3) No! (4) No? Each of these possibilities has been adequately advocated by two classes of people: (a) protagonists of air power alone; (b) co-operationists. A few quotations will demonstrate several lines of thought:

"I am utterly convinced that the outstanding vital lesson of this last war is that air power is the dominant factor in this modern world and that, though the methods of exercising it will change, it will remain the dominant factor as long as power determines the fate of nations."²

"... It is not reasonable to speak of an air offensive as if it were going to finish the war by itself..." — Churchill (as Minister of Munitions, 1917).

Seversky believes that dominance in the air is a "virtual guarantee of victory."³

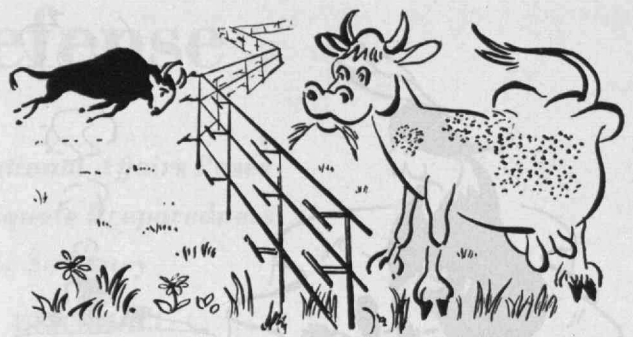
"... in face of the technical development of aviation today, in case of war the strongest Army we can deploy in the Alps and the strongest Navy we can dispose on our seas will prove no effective defense against determined efforts of the enemy to bomb our cities."⁴

"The popular idea of a bomber aircraft as the all-powerful, all-seeing eye of a malevolent and annihilating enemy which obtained in 1938 and onwards has been largely modified as a result of the experiences of World War II. It is realized that there are many limitations to the use of bomber aircraft as weapons of destruction."⁵

"The events of this war have disclosed that air enthusiasts have overestimated the power of the air arm quite as much as orthodox Army or Navy officers have underestimated it. Air power has not proven itself to be an all conquering force."⁶

In lieu of an opinion poll, answers (2) and (4) are probably the only reasonable ones, and indeed the reservations attached constitute their only differences. As the co-operationists would have it, the situation is then that air power is a concomitant of, but not a guarantee of, victory. Perhaps as much could be said for the infantry or for sea power.

The importance of the role assigned to air power assists in the determination of how much should go into air-defense measures (as well as into our air offense). Since there appears to be ample room for divergent opinions on this subject, the writer may be excused for inserting one of his own. He cannot seem to recognize any immediate urgency for elaborate preparations, but would consider long-range planning and a



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The radar fence has been authorized . . .

certain amount of civil defense organization and training to be the only sensible course of action.

Offense versus Defense

The fact that strategic bombing was not an unqualified success during World War II cannot of course be considered proof of its inefficiency in the future. A-bombs and superbombers may change the situation materially. There are a number of uncertainties involved, however, and the only reliable factor seems to be lack of co-operation on the part of the enemy. To give the discussion a technical flavor, one can write for the forces opposed:

$$B + R \longleftrightarrow D + V$$

in which

B represents the destructive capacity of the attack, whatever the weapons used

R is a measure of ability to continue the attack

D represents the effectiveness of active countermeasures — fighters, guns, and so on

V measures the absorbing capacity of the defense as affected by passive countermeasures — physical vulnerability reduction, organization, and so on

How these various quantities can be expressed, and in commensurate units, is a troublesome question, and hence will not be considered. The important point is that if $(B + R) > (D + V)$ the defense must do something to equalize matters. The difficulty here is that the potential enemy cannot be relied upon to supply values of the quantities involved. Therefore, estimate.

(Continued on page 330)



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... we need to achieve maximum effectiveness with a minimum of cost . . .

² Lord Arthur William Tedder, *Air Power in War*, page 123 (London: Hodder and Stoughton, Ltd., 1948), \$2.25.

³ Alexander P. DeSeversky, *Victory Through Air Power*, page 350 (New York: Simon and Schuster, 1942), \$2.75.

⁴ Giulio Douhet, *The Command of the Air*. Translated by Dino Ferrari, page 10 (New York: Coward-McCann, Inc., 1942), \$4.00.

⁵ Vernon E. R. Blunt, *The Use of Air Power*, page 3 (Harrisburg: Military Service Publishing Company, 1943), \$1.00.

⁶ Cyril C. Caldwell, *Air Power and Total War*, [Introduction] (New York: Coward-McCann, Inc., 1943), \$2.50.

Athletics at M.I.T.

*More than Two Thirds of the Undergraduate Body
Participates in Varsity and Intramural Sports in
a Program Staged by the Students Themselves*

BY WARREN BERG

FRANCIS AMASA WALKER chose the subject "College Athletics" for his address at the Harvard Phi Beta Kappa ceremony in 1893.¹ To ears which were tuned to such a high intellectual pitch this subject was indeed shocking, but by coyly referring to "the vision of Apollo" and "the thronging multitudes of Olympia" the Institute's second president artfully carried his subject over the barrier of indifference and extolled the merits of sane athletics. This much lauded, and also much condemned, address broached the idea that manliness, self-reliance, and both quickness and independence of judgment, are greatly fostered by sane athletics.

This fundamental creed of President Walker's has since run the gauntlet of indifference, encouragement, and enthusiasm. Now, 57 years later, the Institute points with pride to its highly kinetic Athletic Department which offers the student a course in the more intangible subjects which, according to Francis Walker, are taught on the playing fields.

"The Institute of Technology is not a place for boys to play, but for men to work," wrote President Walker.² Freely translated, this statement is not as harsh as it appears, for all Institute men take pride in the "Tech is Hell" slogan, exaggerated as it is. No alumnus desires a relaxing of M.I.T. standards, for to lower the great mental and exhaustive physical requirements of its professional training would be to lower the standing of the Institute itself. By his own doing and the suggestive aim of the Administration, the student, too, realizes that some play will enhance the quality of his work. This belief is supported by the Institute's Administration which accordingly has provided the facilities and the incentive to its students. It is up to the student to enjoy and partake of the benefits which the M.I.T. athletic program affords. Particularly during the past three years, great progress has been made toward making it easier for the student to visualize the benefits accruing to him from participation in athletics.

But M.I.T.'s athletic situation was not always at its present satisfactory stage. Hidden away in the dusty stillness of the library stacks, old volumes of *Technique*, *The Tech*, and *The Technology Review* surrender countless facts and figures which show the turbulence of the Institute's athletic history. Before the turn of the century Technology's athletes gathered in the old Exeter Street railroad shed in the winter and called this the Tech Gym. Other facilities included the Irvington Street Oval (where the Institute's track coach, John Graham, held daily sessions) and the

National League Grounds on Walpole Street (where the baseball and football teams staged their rivalries with Harvard). At that time all expenses for athletic purposes were met by the students themselves. Needless to say many dollars were exchanged for athletic gear over the counter of Horace Partridge, Athletic Outfitters.

In the 1890's the success of a team depended in large measure on the ability of the manager to raise funds. Since this gentleman became so important in the students' activities, the job was a highly sought one. Many Alumni extol the late Charles F. Tillinghast, '95, as the greatest of the early managers because of his ability in raising funds through the medium of advertising on football programs.

The Athletic Club, at that time, consisted largely of track men, although Technology also fielded a team in the Northern Intercollegiate Football Association. As Frederick Metcalf, '90, the *Technique* editor, stated in 1890: "We also ran an eleven and a nine, but pressure of study did not allow sufficient practice or we would have attained a higher level than we did."

Competition was largely between classes, but an early rivalry with Harvard showed itself and football games were an expression of this. The records of 1887 show a loss of 10-12 to Harvard, but what could have happened within a week to make the next Saturday's score Harvard 60, Tech 0?

Student criticism was rife if not always logical. The *Technique* of 1889 stated that, "The Baseball nine had a remarkably successful season, losing in all but two games." Further comment included the need for "a pitcher who is in condition to pitch, since it is now two seasons since we have won a ball game; 'tis better to have no baseball at all than the kind we have had for the last two years." Alumni who made a trip to Williams College that year might whisper of a stop that was made at Pittsfield to "borrow" a pitcher and that additional stops were made to round out the seven-man squad. The pitcher was somewhat less able than advertised, for he dropped the game 70-0. This game caused the disbandment of the nine at the Institute.

Charles Hayden, '90, was president of the Cycle Club which held weekly races starting from the Wattertown Bridge. Tennis became popular, but the poor quality of the courts and the "great number of forfeits" made tournaments impossible. Track was by far the most popular sport — mainly because baseball and football were too time consuming, but "where our athletics show up most advantageously is on the cinder track. Track athletes are peculiarly adapted to our

¹ See references at end of article.

Undergraduate Participation in M.I.T. Athletic Programs (for the Year 1948-1949)*

Activity	No. of Under- graduates Part- icipating	Per Cent of Undergraduate Body Partici- pating
Unorganized optional ath- letic recreation	400	10.9
Organized intercollegiate program only	407	11.1
Organized freshman classes	410	11.2
Organized intercollegiate and intramural	814	22.2
Organized intramural pro- gram only	1,345	36.7
Total organized activities	2,162	59.0
Total organized and un- organized recreation on campus	2,562	70.0

* Most of the figures above include some duplication, since it is found that about 10 per cent of the students engaged in one form of athletic program also engage in one or more other programs. Perhaps the most significant figure in the table is the figure of 2,162 different students (out of a student body of 3,667 undergraduates) taking part in organized athletics. There is no duplication in this figure which accounts for 59 per cent of the undergraduate student body.

Institute life. The time required for training is slight, and need not be set at any special hour."³ In one set of games, 10 records were broken out of 11 events contested. The Boston Board of Aldermen canceled the next track meet, however, because, as the *Technique* editor bluntly put it, "The Honorables were not admitted free."

The turbulence of the early athletic history of M.I.T. prompted many reformists to go to work on petitions. One such document cried: "When we consider the immense disadvantages under which we labor, as compared with other colleges, we live in hope that the Faculty or Corporation may soon be able to do their part toward our physical as well as our mental advancement."⁴ The Faculty answered this 1891 petition by appointing Albert Whitehouse as trainer and gymnasium instructor.

Class spirit was dealt a severe set back in 1891 when the tug-of-war was abandoned because of the great strain on the participants. This caused a great hue and cry. That same year a campaign was started to interest the "grinds" in sports. Polo was tried but was short-lived as one member of the league was caught cheating, although "in a league properly run and composed of square players Tech should win the championship easily. The public will never support unfair play."⁴

Chivalry in sports was not nonexistent, however. John A. Rockwell, '96, a name famous in the athletic history of the Institute, tells of an event in an annual cross-country race with Dartmouth College in which a Dartmouth runner had taken the wrong path to the finish line. The M.I.T. runner stopped, called out the runner's error, waited for his return, and was subsequently beaten in the race.

Track records were recorded and jealously guarded by each school and then published for comparison. The M.I.T. recorder took Harvard's claim for a new record in the 440-yard run with a grain of salt, for if you follow the asterisk to the bottom of the page you

will find the word "doubted." Joshua Crane, '92, set new records for Technology in the 120- and 220-yard hurdle races, but the records were not allowed because "a pistol for starting was not available."

In this period it is recorded that: "From the Faculty little encouragement has been received and a disparaging atmosphere has ever been present."⁵ Although the students themselves were still unhappy over the Institute's treatment of extracurricular activities, the different classes maintained their intense rivalry. Each class now had its own football team. "The Class of '97 marched to the football game behind the finest German Band that Chelsea could produce, and then drilled smartly."⁵

Mr. Graham, who took charge of the training of Technology's track men, entered a team in the eighth annual championships of the New England Intercollegiate Athletic Association at Worcester and, "much to everyone's surprise won the event; much credit to Captain Fred Lord and to Mr. Graham who has few equals and no superiors."⁵

"It has been found necessary to unite under a common head the various branches of athletics, in order that by combined efforts better results may be obtained."⁵ This necessity prompted the formation of the Track Athletic Team which was composed of only the best athletes at the Institute. This meant that Technology would now be represented by a varsity team in many sports, rather than by class teams alone.

M.I.T. has not been associated with football for many years, at least on an intercollegiate basis, yet the past history of the gridiron sport is a glorious one. Following a heated dispute at Springfield concerning a protested game, the old football league was disbanded and a new Eastern Intercollegiate Football Association was formed with Technology gaining the initial championship. "In the first of the championship series Technology met with the Dartmouth team on home grounds. This year pains had been taken to secure an impartial umpire, and the game was an evenly played and highly exciting contest."⁶ This was the only league game in which the Institute's team was scored upon that year. Victories included a 74-0 win over Trinity College, 54-0 against Amherst College, and 24-0 against Stevens Institute of Technology. The name of Captain Edward W. Herrick, '88, was linked to this great team of 1887.

On the night of November 21, 1887, a great torch-light parade was held in honor of the winning of the championship. Nightgowns and plug hats were the uniforms of about three hundred students.⁶ "The procession marched down Exeter Street to Beacon, thence to Tremont, up Boylston to the Institute, around the buildings to Berkeley, to Columbus Avenue, up to West Canton, to Huntington Avenue."⁶ A bonfire was built at the Union Grounds and ignited, and "a scene of the wildest enthusiasm began." The *Saturday Evening Gazette* referred to one game as follows: "The Harvard football team, to use a slang phrase, 'Caught a Tartar,' when it played with the representatives of the Institute of Technology on Jarvis Field Cambridge yesterday afternoon. Although the latter did not win, they held the Harvard men down to eighteen points, which much chagrined the Cambridge collegians."

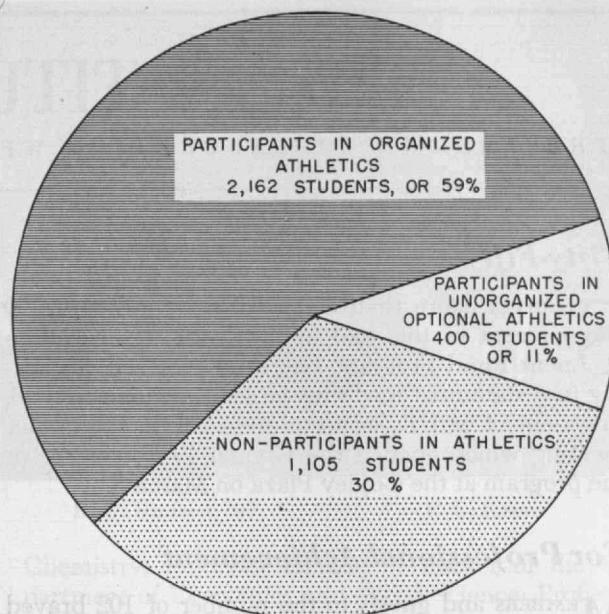
Henry S. Pritchett was called to the presidency of the Institute in 1900. The most notable work of his administration was perhaps the development of social activities and the betterment of the physical condition of the student life. Related to athletics was the alumni fund of \$1,000,000 to be used as a clubhouse and gymnasium in memory of President Walker. Technology also purchased Tech Field in Brookline, which was used by the athletic teams until the Institute moved to its present site. Varsity football and baseball were abandoned by vote of the student body and the emphasis was placed on track work, where individual effort is the greatest factor of success. It was found that the "conditions under which the Institute students work do not allow of the necessary cooperation for the development of efficient teamwork, and that too few men were being benefited by these sports."⁶

A student athletic association was founded and the control of all sports was placed under its supervision aided by an Alumni Advisory Council on Athletics. Basketball was inaugurated early in the century as was ice hockey, and both teams met with success. Tennis and fencing improved in popularity, and the comment of President Maclaurin who, upon seeing the Charles River, stated, "All this water and no crew?" prompted development of a crew. Boxing and wrestling took their places as intercollegiate sports, while the presence of the military unit at M.I.T. aided the formation of a rifle team.

Field Day blossomed into a well organized and enthusiastic display of school spirit with more and more events added to the class rivalry to invite greater participation. A student publication in 1924 predicted that about 25 per cent of the student body was engaged in some form of athletics. Compare this to the 58 per cent who participate today.

The desire to win a game fairly is, of course, a natural and healthy one, and M.I.T. has been proud of its winning teams. But good sportsmanship and the development of the spirit of co-operation have always been regarded as fundamentally more important than the development of a few athletic stars. Throughout the years, the uppermost thought which has guided athletics at M.I.T. has been the strong recognition that any program of physical activity should contribute primarily to a person's general well-being and progressive development. It is difficult to say how much of this sound policy is the result of the wise counsel which the Institute's athletic program received from Dr. John A. Rockwell, '96, chairman of the Advisory Council on Athletics, who devoted more than half a century of leadership to practice. Certainly those who served with Dr. Rockwell, Ralph T. Jope, '28, and others on the Athletic Council, have made a valuable contribution in establishing and developing a sound policy for M.I.T. athletics during the past years.

When World War II ended, the Institute faced its postwar responsibility with a greatly expanded student body. Enrollment in its Graduate School had multiplied several-fold and, largely as a result of its brilliant record of research and administration during the war, M.I.T. was conducting a vast research program. Obligations of its staff to serve their professions, communities, and the nation had likewise increased. It became evident, therefore, that the new postwar



Of 3,667 undergraduates at M.I.T. during the 1948-1949 school year, 70 per cent engaged in some form of recreational athletics. Of the remaining 30 per cent, nearly all played an active role in one or more of the other extracurricular activities available at the Institute.

conditions would require certain administrative changes in its athletic program. The path so wisely delineated by the Alumni Advisory Council on Athletics would be recognized and followed. Many at the Institute, in addition to Alumni, feel that a satisfactory formula for a truly beneficial athletic program had been evolved throughout the years. But it was evident that the implementation of the desired program had passed beyond the limitations of any advisory group, however willing and able.

In 1947, Ivan J. Geiger was called to the Institute to become the first athletic director and director of physical education. The students were eager for a new approach to athletic activity and their wide range of interests and increased numbers made reorganization of athletic teams desirable. An unquestionable need existed for a full-time athletic staff supplemented by part-time coaches. The athletic staff now includes one director, nine full-time coaches (instructors), twelve part-time coaches, two part-time trainers, and two full-time secretaries. A man was hired to care for equipment, and is now a full-time employee.

With the procurement of instructors, an elaborate system of physical training was established and made compulsory for freshmen. The system gave freshmen the opportunity to choose an activity and to receive instruction in this sport. Class instruction was offered as electives in softball, tennis, soccer, sailing, and beginning swimming in the fall; beginning and advanced swimming, basketball, squash, badminton, and volley ball during the winter season; softball, baseball, tennis, golf, beginning swimming, Red Cross Life Saving, and sailing in the spring season.

Freshmen are excused from the physical education program while competing on one of the freshman squads. Slightly more than half of the freshmen of 1948-49 participated in the Freshman Intercollegiate Athletic Program for a period of four weeks or more.

(Continued on page 324)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Fifty-Fifty

SLIGHTLY more than \$10,000,000, representing 50 per cent of the goal in the Institute's Development Fund Program, has been received, according to a statement made by James R. Killian, Jr., '26, President of M.I.T., in an address before the dinner meeting which opened the Greater Boston phase of the program at the Copley Plaza on March 8.

For Professional Achievement

MEMBERS and guests to the number of 102 braved a wintry evening to attend the 273d meeting of the Alumni Council on February 27 at which C. Adrian Sawyer, Jr., '02, President of the Alumni Association, presided. Present at this meeting, for the first time in many months, was Karl T. Compton, chairman of the Corporation, whose return to Cambridge was enthusiastically welcomed. Dr. Compton spoke briefly on a few incidents which occurred during his recent trip to Honduras, and emphasized the role the Institute was playing in cementing international relations through the training of foreign students.

President Sawyer then called upon Anthony Able, '20, to explain his proposal that there be an annual award, made by the Institute, in recognition of outstanding professional achievement. It was suggested that the award might be comparable to honorary degrees conferred by American universities.

Council members were advised that the Executive Committee of the Association had voted to request President Killian to appoint a committee from the Corporation, Faculty, and Alumni to investigate the advisability of such an award.

As part of the business portion of the meeting, it was reported that nine members of the Institute's Faculty or staff had visited six alumni clubs from Charleston, W.Va., to Wellesley, Mass., between January 31 and February 21. The name of the Worcester County Alumni Association of M.I.T. was changed to M.I.T. Club of Central Massachusetts; and Francis A. Barrett, '24, was elected for a five-year term on the Alumni Fund Board, replacing Harold Bugbee, '20, whose term expires June 30, 1950.

In reporting on recent activities of the M.I.T. Administration, President Killian took evident pride in reporting the excellent record which had been made by medical students who received their premedical training at M.I.T. Studies of the records of students from 365 different institutions of higher learning who took examinations for entrance into medical college in October, 1948, February, 1949, and October, 1949, showed that those who had taken their premedical preparation at M.I.T. were well toward the top of the group in their index of general ability, understanding of modern society, and their training in premedical science. This survey gives further proof that an M.I.T. training provides a sound educational foundation for fields other than those of science, engineering, and architecture.

Class Reunions

Safaris of M.I.T. men to Cambridge for Alumni Day will also include further journeyings for some to participate in class get-togethers. Listed below is information on reunions which has been received from class secretaries and reunion chairmen as this issue of The Review goes to press:

- 1890 June 11. Probably early afternoon dinner at the Copley Plaza, Boston.
- 1895 June 12, Alumni Day. Members will meet at luncheon in Du Pont Court. Luther K. Yoder, reunion chairman, 69 Pleasant Street, Ayer, Mass.
- 1900 50th reunion. June 9-11, The Pines, Cotuit, Mass.; June 9, participation in commencement activities; June 12, special Class table at Alumni Day luncheon, Du Pont Court. Elbert G. Allen, reunion chairman, 54 Bonad Road, West Newton 65, Mass.
- 1905 June 13-15. Oyster Harbors Club, Osterville, Mass. William G. Ball, reunion chairman, Box 285, Cotuit, Mass.
- 1910 June 9-11. Hotel Griswold, New London, Conn. Clifford C. Hield, reunion chairman, 719 Nicollet Avenue, Minneapolis 2, Minn.

- 1915 June 9-11. Coonamesset Lodge, North Falmouth (Cape Cod), Mass. Class get-together preceding banquet at Copley Plaza on June 12, Alumni Day. Azel W. Mack, reunion chairman, 40 St. Paul Street, Brookline 46, Mass.
- 1920 June 9 week end. Sheldon House, Pine Orchard, Conn. Alfred T. Glassett, reunion chairman, 101 Park Avenue, New York 17, N. Y.
- 1925 June 9-12. Friday afternoon until Monday morning at Hotel Griswold, New London, Conn. F. Leroy Foster, reunion chairman, Room 5-105, M.I.T.
- 1930 June 10-11. Riversea Inn, Saybrook, Conn. Hermon H. Scott, reunion chairman, 385 Putnam Avenue, Cambridge, 39, Mass.
- 1935 June 10-11. Hotel Rockmere, Marblehead, Mass. John H. Colby, reunion chairman, 25 Jefferson Road, Wellesley Hills 82, Mass.
- 1940 June 10-12. Robert A. Bittenbender, reunion chairman, 287 Waban Avenue, Waban 68, Mass.
- 1945 June 9-11—tentative dates. Clinton H. Springer, reunion chairman, 44 Church Street, Bristol, R.I.

For other data, consult your class secretary.



H. S. Ford



V. O. Homerberg, '21



R. G. Hudson, '07



F. G. Keyes

M.I.T. Photos

Dr. Killian also reported that a study made by Malcolm G. Kispert, 2-44, Administrative Assistant to the President, showed that M.I.T. activities were being conducted generally by young men. Of the M.I.T. staff, 4 per cent were in the 20-23 year age group, 32 per cent were between 24-29; 36 per cent between 30-39; 16 per cent between 40-49; 10 per cent between 50-59; and only 2 per cent were 60 and over.

John B. Wilbur, '26, Head of the Department of Civil and Sanitary Engineering at M.I.T., was then called upon to speak on the master plan of express ways for Boston which includes an inner-belt route and eight radial express ways for facilitating motor traffic through Boston. Professor Wilbur is serving as chief engineer for Section 1 of the Boston Central Artery and Connections.

For Services Rendered

Two administrative officers and five Faculty members, all of whom have served the Institute for many years and all of whom are well known to M.I.T. Alumni, will retire next July. The list includes: Horace S. Ford, Treasurer; Edward L. Moreland, '07, Executive Vice-president; Professor Ralph G. Hudson, '07, of the Department of Electrical Engineering; Professor Frederick G. Keyes of the Department of

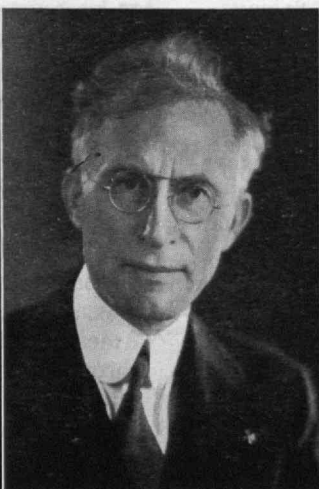
Chemistry; Professor Donald S. Tucker of the Department of Economics and Social Science; Professor Victor O. Homerberg, '21, of the Department of Metallurgy; and Professor Frederick K. Morris of the Department of Geology.

Mr. Ford has been principal financial officer of the Institute for the past 36 years and, as its treasurer, a member of the M.I.T. Corporation since 1934. Mr. Ford, a native of Gloucester, entered banking in 1903, before coming to M.I.T., as a member of the staff of the Old Colony Trust Company, advancing to assistant cashier in 1911. In addition to his service as the Institute's chief business officer, Mr. Ford has been unofficial financial and business adviser extraordinary to hundreds of students and to many M.I.T. student organizations. Mr. Ford is also prominent in Boston financial affairs as a director of the American Surety Company, Arthur D. Little, Inc., Godfrey L. Cabot, Inc., Gas Industries Fund, Inc., Harvard Co-operative Society, Inc., Home Savings Bank, Liberty Mutual Insurance Company, and Old Colony Trust Company. He is treasurer of the American Academy of Arts and Sciences.

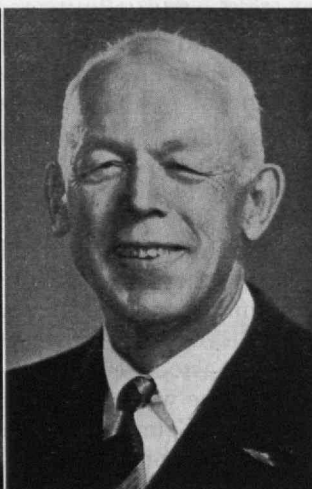
Dr. Moreland was appointed executive vice-president in 1946 after serving as head of the Department of Electrical Engineering from 1935 to 1938 and as dean of engineering from 1938 to 1946. Born at Lex-



E. L. Moreland, '07



F. K. Morris



D. S. Tucker

M.I.T. Photos

ington, Va., in 1885, he received his bachelor of arts degree from the Johns Hopkins University in 1905, then took advanced studies at M.I.T. where he received the degree of master of science in 1908. Upon graduation Dr. Moreland went into engineering work with particular interest in the development of steam and hydroelectric plants, and problems of power transmission and utilization in the public utility field and for large industrial plants. He has been a member of the firm of Jackson and Moreland of Boston since 1919.

During World War I, Dr. Moreland served as captain and later major of engineers in the American Expeditionary Force. For his services in World War II the War Department awarded him the Medal of Freedom, and President Truman bestowed upon him the Medal for Merit, the highest civilian award, "for exceptionally meritorious conduct in the performance of outstanding services." Dr. Moreland has long been active in the affairs of the M.I.T. Alumni Association and in engineering societies, particularly the Engineers' Council for Professional Development and its Committee on Engineering Education.

Professor Hudson is well known as an educator, author, and engineer in the field of electrical engineering. A member of the Department of Electrical Engineering at the Institute since 1907, he has been in charge of the course in general science and general engineering since 1932. He has served for many years as chairman of the Committee on Commencement. Holder of M.I.T.'s bachelor of science degree, 1907, Professor Hudson in addition to his teaching duties has carried on an extensive practice as consulting engineer, including director of research for the Electric Welding Committee of the Emergency Fleet Corporation from 1917 to 1918. In 1948, Professor Hudson received the James F. Lincoln Arc Welding Foundation award for notable contributions to engineering literature. Among his publications are *The Engineers' Manual*, *An Introduction to Electronics*, and *American Handbook for Electrical Engineers*, of which he was associate editor. He will continue as a lecturer.

Dr. Keyes is internationally known for his achievements in low-temperature research and in measuring with high precision the physical properties of fluids. He was the recipient of the Theodore William Richards medal for the northeastern section of the American Chemical Society for "distinguished achievement in chemistry" in 1942, and in 1948 the American Society of Mechanical Engineers awarded its highest honor, the society's medal, to him as "an eminent contributor to our knowledge of physical chemistry."

Born in Kingston, Canada, in 1885, Dr. Keyes was educated at Rhode Island College where he received the degree of bachelor of science in 1906. Graduate work at Brown University won him his Ph.D. degree in 1909. His teaching career began at Brown in 1906, where he remained until he joined the staff at M.I.T. in 1910 as instructor in theoretical chemistry. In 1912 he became a research associate in physical chemistry. From 1913 to 1916 he was chief engineer for the Cooper-Hewitt Electric Company, returning to the Institute as associate professor in 1916. In 1920 he was made director of the Research Laboratory of Physical Chemistry and in 1922 became acting head of the

Department, then advancing to complete charge from 1923-1945. In World War I, Dr. Keyes, with the rank of major, was director of the Chemical Warfare Service Laboratory at Puteaux, France.

Dr. Tucker's teaching career led to association with a number of American colleges. Born in Peoria, Ill., in 1884, his early education was obtained at Dulwich College, London, and at Colorado College where he was graduated with the degree of bachelor of arts in 1906. Subsequently he received his master of arts degree from Williams College and his Ph.D. at Columbia University. For a year Dr. Tucker was secretary of Colorado College. Between 1914 and 1916 he was lecturer at Columbia University and subsequently for four years he was an assistant professor at Wellesley College where in his last year he also served as head of the economics department. Later he was acting head of the economics department at Tufts College. He has served as consultant to more than 100 companies and is particularly active in the direction of charitable activities, such as the Red Feather campaign, Red Cross, and heart clinic, in addition to serving on the National Affairs Committee of the Cambridge Chamber of Commerce. He has been associated with the Institute's Department of Economics and Social Science since 1919.

Dr. Homerberg is an outstanding authority on alloys of iron and steel, including the case-hardening of steel with ammonia gas. Born in Balaton, Minn., in 1889, Dr. Homerberg attended the Philadelphia College of Pharmacy and Science before entering M.I.T. from which he received his doctor of science degree. He began his teaching career while still a student, first in chemistry and then in metallography and metallurgy. He was advanced to the rank of professor in 1939. He has written extensively for technical journals and has served as consulting metallurgist for numerous concerns. During World War II he was active in co-operating with aircraft-engine builders and worked on metals suitable for tanks and other war matériel.

Dr. Morris is internationally recognized as an authority on the geological structure of Asia. Born in Salt Lake City, Utah, in 1885, he was educated in New York City and was graduated from the College of the City of New York in 1904. He then carried on research at the Marine Biological Laboratory and the United States Bureau of Fisheries at Woods Hole, Mass., followed by further biological and geological study at Columbia University, where he received his doctor of philosophy degree in structural geology. Field work and further study were carried on in Nova Scotia and in France and England, and in 1920 he went to China as professor of geology at Pei Yang University, the Government engineering school at Tientsin. There he studied the geology of northern China and traveled through the provinces. In 1922 he was a member of the Third Asiatic Expedition of the American Museum of Natural History which traveled through Mongolia during 1922, 1923, and 1925, the intervening year being spent in research at home. Dr. Morris became assistant professor of structural geology at the Institute in 1927 and was advanced to a full professorship in 1931.

(Continued on page 322)

BUSINESS IN MOTION

To our Colleagues in American Business . . .

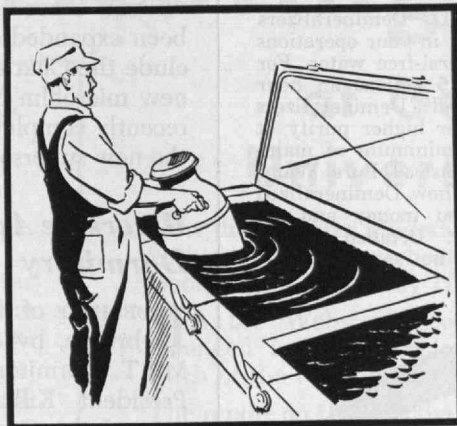
Milk must be cooled quickly after milking, in order to lessen the growth of bacteria, and this has led to the development of various methods of reducing the temperature. On the non-electrified farm the dairyman may make use of a cool springhouse, or natural or artificial ice. Where electricity is available, however, mechanical refrigeration has become a virtual necessity. It might be thought that such an application of refrigeration would entail no particular problems, but that is not the case. The milk cooler presents its own special conditions of use, and hence requires specific, not general, consideration of those conditions.

In comparatively recent years the tank-type cooler has come prominently forward. This consists of a large tank of water, held close to or at freezing temperature by mechanical refrigeration. The 80-lb. cans of warm milk are immersed in the water until cooled. In some models, the tubes or pipes through which the refrigerant flows are within the tank itself, in order to avoid the insulating effect of the tank lining if the coils were outside. This location of the coils, however, subjects them to some possibility of mechanical injury, and complicates cleaning. Another problem that has arisen in connection with these coolers is the selection of the material for the lining. It has to be able to stand not only the weight of the cans, but the shocks of dropping them to the bottom, and, of course, must be made watertight. During the war the only practical material available was galvanized iron, which rusts quickly under such conditions. When restrictions were lifted on the use of copper and copper alloys, a large manufacturer of these coolers came to Revere with a

number of ideas and suggestions. He claims to be the originator of the tank-type cooler, incidentally.

His basic thought was that it should be possible to line the tank with non-rusting copper. Then, since copper has the highest heat-conductivity of any commercial metal, he planned to attach the copper cooling coils to the outside of the copper lining. Could we furnish a copper that could be worked easily, yet be sufficiently strong to withstand the inevitable mechanical abuse?

Problems such as this challenge Revere. We worked closely with our customer, investigating the mechanical requirements of fabrication and of use, and the heat-conductivity needs. Two of our sheet metal specialists were assigned to the project, and went to work with their staffs. Tests showed that electrolytic copper was not mechanically feasible, and eventually a specially-modified copper was tried and found entirely successful. The Revere welding department developed a fast method of attaching the Dryseal copper tube to the



outside of the special copper lining, and the project was finished. Today, the manufacturer is selling all he can produce of this type of cooler, and, profiting by our mutually-developed data, is expanding his use of special copper alloys in coolers for other industries.

Here is a case that is fairly typical, we think, of the manner in which American industry works together as it moves ahead. If you are a manufacturer and have an idea whose practical expression may require specialized knowledge, why not talk it over with your suppliers? You may go much further and faster with than without their collaboration.

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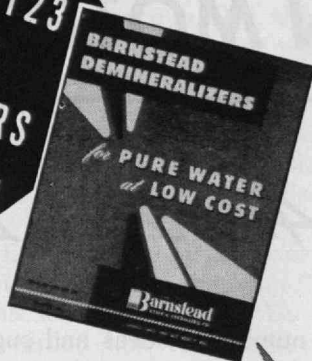
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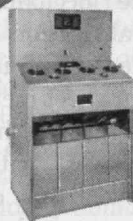
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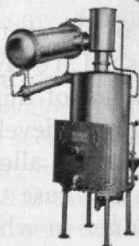
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THE INSTITUTE GAZETTE
(Continued from page 320)

Visitors Welcome

TECHNOLOGY will hold its 17th biennial Open House on Saturday, May 13, from 12:00 M. to 7:00 P.M. Some 40,000 to 50,000 people are expected to be on hand when the public is invited to view the Institute, just prior to the Boston Jubilee Celebration. All of the M.I.T. educational and research facilities will be on display during the day. The exhibits will stress the application of various types of scientific and technological research to everyday life.

There will also be many exhibits illustrating all phases of extracurricular student life, and several athletic contests. The Departments of Aeronautical Engineering, Electrical Engineering, Physics, and Chemical Engineering are planning special demonstrations.

Although Open House has long been a tradition at M.I.T., this will be only the second renewal of the event after a lapse during World War II. The last Open House, held in 1948, attracted more than 30,000 visitors. Since that time the school's facilities have been expanded considerably. The latest additions include the Charles Hayden Memorial Library with its new microfilm collection, the naval towing tank, the recently completed 300,000,000-volt synchrotron, and the new supersonic wind tunnel.

**Riverside Apartments Purchased as
Dormitory**

PURCHASE of the Riverside Apartment Hotel, Cambridge, by the Institute for ultimate use as an M.I.T. dormitory was announced on March 8 by President Killian. Speaking at a dinner which opened the Greater Boston phase of the Institute's \$20,000,000 Development Fund Program, President Killian reported M.I.T.'s decision to purchase the
(Concluded on page 324)

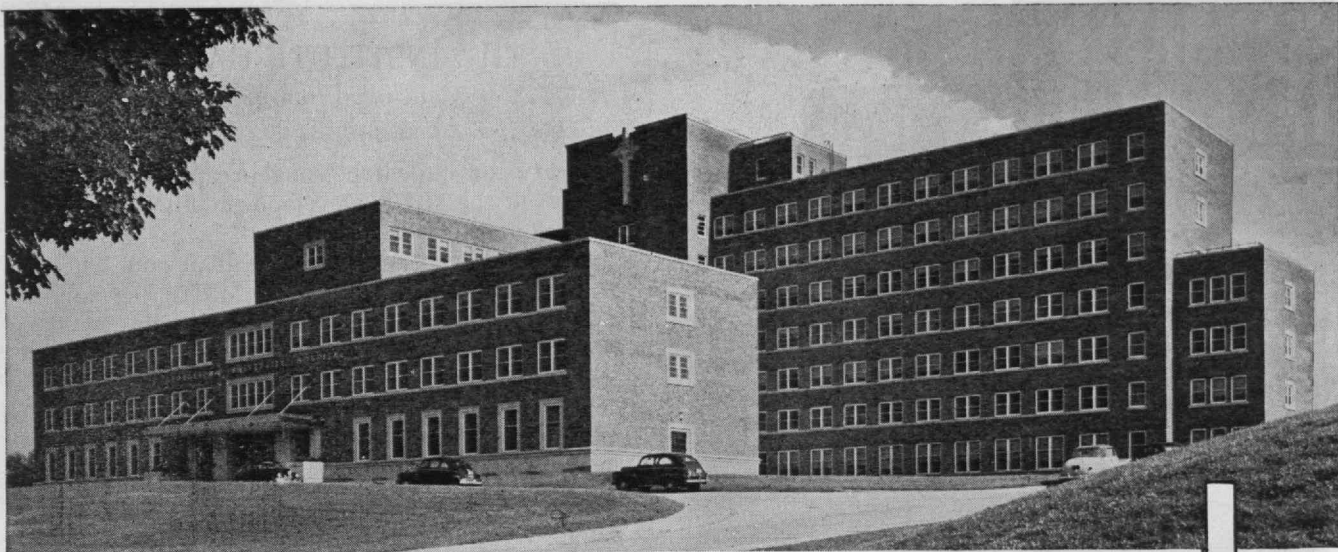
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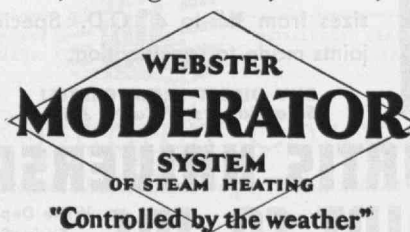
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THE INSTITUTE GAZETTE

(Concluded from page 322)

property for student housing because of the initial success of the M.I.T. Development Fund, and in anticipation of its steady growth.

"New student housing," Dr. Killian said, "is one of the primary objectives of the M.I.T. Development Program. We can be more effective with our educational program if we can provide a stimulating environment that promotes community responsibility."

The Riverside Apartment Hotel building, located at 420 Memorial Drive adjoining the M.I.T. athletic fields, will eventually provide accommodations for over 600 students. Its use for this purpose will not be immediate, however, because of existing tenancies. Addition of the Riverside building will give M.I.T. dormitory facilities for a total of 2,100 students.

The dinner, attended by more than 1,000 M.I.T. Alumni and friends, was arranged by the Greater Boston Committee of the M.I.T. Development Program, among whose leaders are Phillips Ketchum, corporation lawyer, and Thomas D. Cabot, Vice-president and Treasurer of Godfrey L. Cabot, Inc. Speakers, in addition to Dr. Killian, included Karl T. Compton, chairman of the M.I.T. Corporation; and Marshall B. Dalton, '15, President of the Boston Manufacturers Mutual Fire Insurance Company, who is general chairman of the M.I.T. Committee on Financing Development.

ATHLETICS AT M.I.T.

(Continued from page 317)

When one considers the early days of the Institute and the "athletic facilities" provided, and then stands on the steps at 77 Massachusetts Avenue and surveys the expanse of Briggs Field, and more important, the number of students active on this area, one realizes that student welfare is paramount at the Institute. The modern Alumni Swimming Pool is a thing of practical beauty and never fails to receive the gasps of astonishment from members of visiting teams who meet the "Engineers."

Briggs Field now includes a football field surrounded by a quarter-mile track, a baseball diamond, a soccer field, floodlighted for late fall practice, two lacrosse fields, four softball diamonds, and ten tennis

(Continued on page 326)



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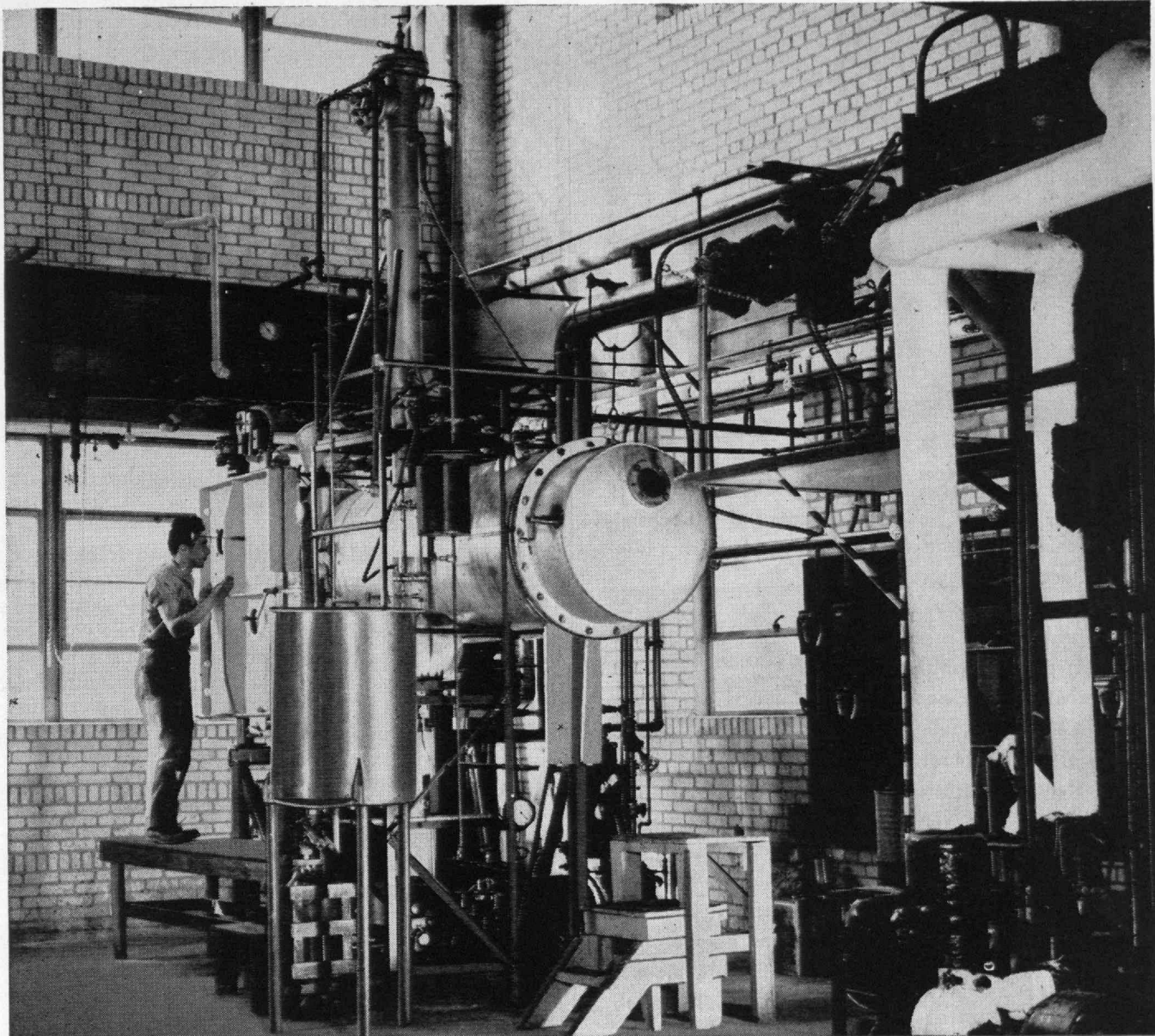
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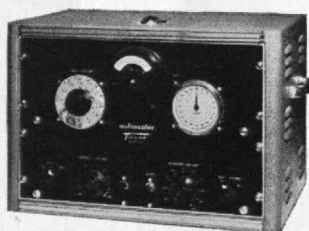
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ATHLETICS AT M.I.T.

(Continued from page 324)

courts. In one corner stands the Briggs Field House with its modern locker and shower rooms. Adjacent to this is the new Rockwell Athletic Cage which provides the many athletic teams the opportunity to train on a dirt floor during off-season or inclement weather. The building is 200 x 165 feet with one half of the area completely netted for use by "ball" teams.

The Institute is proud of its 18 varsity squads which compete with the best teams in New England and in the East. Sports followers are ever cognizant of the difficulties under which Technology athletes must train and compete. By providing the best in equipment and by steadily improving the facilities, the Institute, in recent years, has gained the applause of the sports-following public. The goal is to provide the opportunity for competition to the student under the best possible conditions. When victory occurs, it is that much sweeter.

At this year's Millrose Athletic Club track meet held in the Madison Square Garden, New York City, this past February, the Technology mile-relay team nipped Princeton by a foot at the finish. Following the two leaders were Harvard and Yale. From a public relations point of view the victory most certainly elevated the name of Technology in the minds of the 15,000 present and the thousands who read of the event in the next day's newspapers. Likewise, this year, our basketball team made its initial appearance in the Boston Garden before 13,000 basketball fans who had come, not to see the M.I.T. team, but the three other teams on the court that night. The fact that the Beavers rallied to come only one point shy of defeating a highly favored opponent caused the fans in attendance to stand and cheer loudly as the M.I.T. team left the floor. The basketball team is currently in a four-game win streak, and in February against Bowdoin set an all-time scoring record for a single game with 83 points. The varsity swimming team has defeated opponents in the past eight meets, and maintained the victory streak the hard way by winning two of the meets in two successive nights. The baseball squad will spend the spring vacation in the Virginia-Washington, D.C., area competing against five of the colleges in that territory.

Statistics for 1948-1949 show that 814 men of Technology competed in one or more of the 18 varsity sports. The varsity and freshman teams competed in

(Continued on page 328)

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ATHLETICS AT M.I.T.

(Continued from page 326)

269 intercollegiate contests. Even more impressive is the elaborate intramural sports program which last year attracted 1,345 different M.I.T. men to contests in eight different sports or 686 intramural contests. Many men competed on more than one team making the over-all participation 2,447.

A total number of athletic competitive opportunities afforded to the intramural or intercollegiate participants to actually compete in scheduled athletic contests may be computed by multiplying the average number of participants that have competed in specific contests in the past by the number of contests scheduled. This picture is quite interesting in that a total of 3,941 opportunities were provided in the intercollegiate program for an average of 4.8 contests per man; in the intramural program a total of 6,223 opportunities provided for an average of 4.6 contests per man. Thus, there are opportunities for participants at both levels of the programs to participate in an average of 4.7 full contests.

As a result of further computation it is possible to point out that a grand total of 10,164 scheduled athletic competitive opportunities were afforded to the total of 3,667 undergraduates or an average of 2.77 contests per student. This figure would undoubtedly rank quite high in comparison to colleges of comparable size. Above and beyond the opportunities provided for as described, one cannot overlook the recreational and class instructional opportunities open to M.I.T. men at all times. The Sailing Pavilion, Alumni Pool, and Squash Courts, in particular, offer tremendous opportunities for unscheduled use.

When one further considers that practically all of the Institute's athletic activities, which include daily practice sessions, occur between the hours of 5:00 and 7:00 P.M., the facts are particularly gratifying. Can there be any question of the students' desire for athletic participation when these same students are willing to practice and drill during the normal supper hour and thus extend the inevitable study hours?

The M.I.T. Athletic Association is unique among athletic associations of all universities throughout the country. Not only is the M.I.T.A.A. an organization run in great part by the students — from the policy-making to the financial end of the work — but the Athletic Association through its student members emphasized co-operative nonprofessional sports long before the present dislike of sports-scholarships and subsidized athletes was made nationally apparent.

There are four bodies from which athletic policy can originate: the Executive Committee of the Institute, the Athletic board, the Executive Committee of the Athletic Board, and the Athletic Association. Of these the Athletic Association is truly the foremost body, for it is here that all motions, changes to the constitution, and similar matters are discussed and voted upon. The Athletic Association Board, or "A" Board as it is called, includes two members of the Faculty, two Alumni, the director of athletics, the medical director, the dean of students, the president, varsity vice-president, and treasurer of the Association.

(Concluded on page 330)

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ATHLETICS AT M.I.T.

(Concluded from page 328)

tion. This group is primarily concerned with policy making in an advisory capacity to the Association.

With the aid of the director of athletics and these two groups, who have the farsightedness to realize the tremendous benefits students gain from these activities, the M.I.T.A.A. continues to hold its unique position. It is to the credit of these men that they have had the forbearance to restrain themselves from laying a heavy hand on the operations of the organization though at times actions taken by the students may temporarily be detrimental. The lack of total efficiency which sometimes prevails in the Association is far overshadowed by the untold benefits the student derives from the experience he gains in a responsible position, the engendering in the student of a more social outlook on business, and the psychological lightening of the engineering and scientific work of the Institute. It augurs well for the future to the mutual benefit of the Institute and the student body.

REFERENCES

¹Munroe, James P., *A Life of Francis Amasa Walker*, page 391 (New York: Henry Holt and Company, 1923), \$4.00.

²Munroe, *opus cited*, page 288.

³*Technique*, 1890, "Athletics."

⁴*Technique*, 1891.

⁵*Technique*, 1895.

✓ ⁶Darling, H., "Technology's Football History," *The Institute*, February, 1905.

⁷*Concerning the Massachusetts Institute of Technology*, 1909.

AIR DEFENSE

(Continued from page 314)

mates of the situation containing a considerable degree of doubt are the only recourse.

Enemy Has Choice of Time

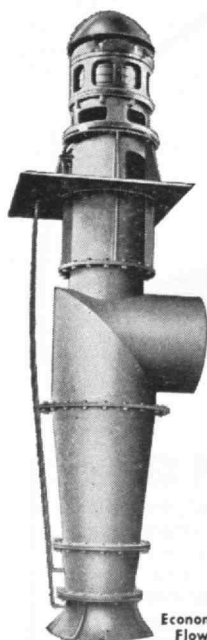
If we think of ourselves as an aggressor nation — or more politically, as willing to exercise extreme preventive measures — the best available estimates of the quantities included in the foregoing expression are required before we undertake an attack. Traditionally, however, we are most apt to find ourselves in the position of the defender. The important choice of time then lies with the enemy who has presumably concluded the auspices to be favorable. It follows that if we are not to fail our duty to posterity ($D + V$) must be maintained at a sufficiently high level to discourage an attack. Maintenance of our ($B + R$) at a similarly high level would not be considered an entirely satisfactory alternative by those who like to spend week ends at home. They may, however, cherish the thought that purely defensive measures can lead at best to a stalemate, and only an offense can lead to a decision. One point worth emphasizing in this connection is expressed by other quotations from Lord Tedder:²

"... purely passive defense would be certain and painful suicide ..."

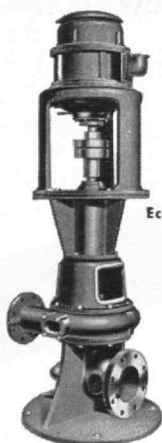
"... An adequate national defense cannot be as-

(Continued on page 332)

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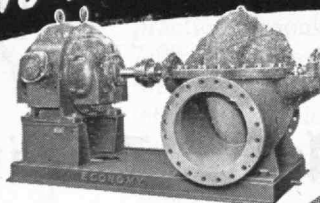


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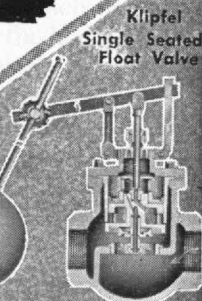
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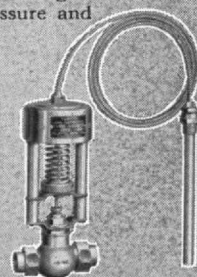
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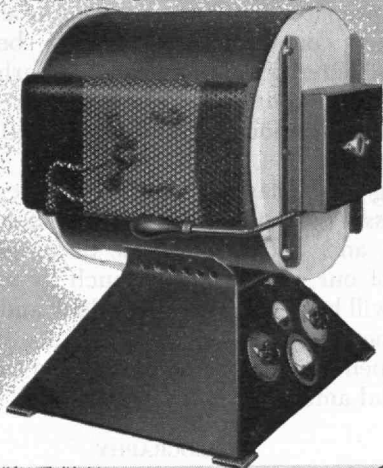
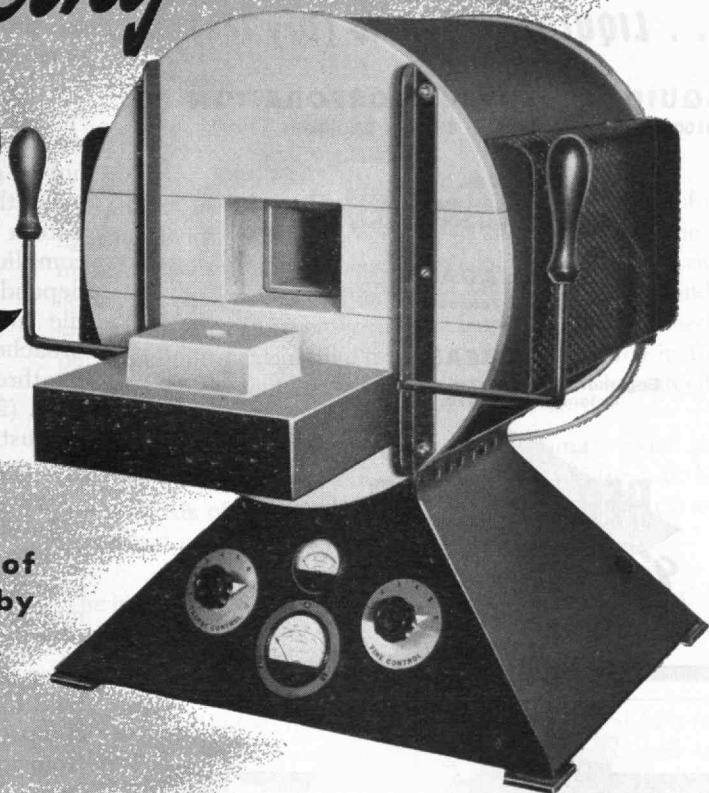
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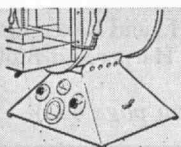
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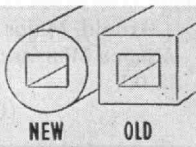
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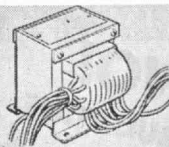
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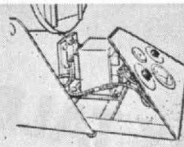
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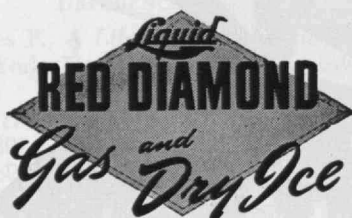
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AIR DEFENSE

(Continued from page 330)

sumed except by an aerial force capable in case of war of conquering the command of the air."

Conclusion

The present instability in world affairs poses a serious problem to military, economic, and political planners. It is required that we be prepared to prevent war by presenting a sufficiently virile military posture to deter an aggressor; or if prevention is impossible, to win a war. At the same time, such preparedness must not be at the expense of economic insolvency.

On the reasonable assumption that we will not initiate a war, timing is the enemy's prerogative. This complicates matters endlessly, for we cannot always depend upon having two years' advance notice of hostile intent. To blueprint a defense plan, two approaches are possible: (1) to build to war strength in the three military departments and mobilize industry now; (2) to stay on a peacetime footing while keeping just ahead of any potential enemy in war facilities and resources.

The second alternative appears to be the less distasteful, though the economic feasibility of either is open to question. Clearly the direction of effort must be toward maximizing military effectiveness at minimum cost.

While geopolitical and economic trends determine to some extent the total permissible premium to be paid for preparedness, the allocation of effort among competing countermeasures must be divorced from local interests and subjected to arbitrary decision. Decision must be based only on the relative merits of the various measures in affecting the outcome of a war.

So long as we play black against a potential enemy, it is necessary to maintain a vigilant watch on our own defenses, and at the same time be prepared with a gambit of our own. It is too much to hope that the process will be efficient, but with luck and a modicum of judgment there should be a chance of economic survival pending realization of that utopian dream, international amity.

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(Concluded on page 334)

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AIR DEFENSE

(Concluded from page 332)

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AMERICAN EDUCATION

(Continued from page 306)

self. The estimated net increase in the population of the world is something like 70,000 people every day. Under the best agricultural conditions it takes about two acres to feed one person. The world is well on its way to running out of that many usable acres. Unless we soon realistically face the necessity of adequate birth control, civilization may well take on the characteristics of a pack of hungry wolves. There is a chance that we will completely outsmart ourselves with our own cleverness.

Depletion of Resources. The conservation of our natural resources is an old and familiar cry. Yet the average person assumes that because his house is warm now, it will inevitably be that way next week, and that because there is gasoline at a filling station today, it will always be there tomorrow. Perhaps these assumptions are correct but they are certainly not automatically true. Despite great progress in science and industry, unless we can make some really substantial gains in the coming years, future generations of the world will find themselves without the physical wherewithal to carry on the kind of life to which we have become accustomed. Already some of our metals in this country, such as copper and lead, are well on the way to depletion. Perhaps more serious is the still-continuing depletion of the productivity of the soil, both in terms of the essential organic and mineral content and the available topsoil which is being lost because of continuous wind and water erosion. Mineral fuels such as petroleum and coal, though still available in large quantity, are certainly not inexhaustible. Not only individuals, but society as a whole, must eventually face the problem of what to do about it. We Americans have contributed most to bringing on this problem of depletion of the natural resources, yet we are only about 6 per cent of the world's population. When the other 94 per cent of the world come to the point, which they urgently desire, of having a standard of living at least equal to ours, this problem of conserving our resources is going to strike us with a severe and possibly crushing blow. Presumably there are ways of solving the problems of maintaining the wherewithal for human beings to

(Continued on page 336)

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AMERICAN EDUCATION

(Continued from page 334)

continue their lives in a decent fashion but the answers are certainly not obvious or easy.

Individualism. The foregoing five points, which I have treated in a very hasty manner, represent in my thinking the most important problem-producing factors in our present physical existence. But it is only intended to be a reasonable sample. Anyone can readily think up a dozen other items that would be worthy of major consideration and I would certainly not be one to gainsay their importance. But, just as in the educational process, time is a limiting factor in this discourse, and there are still other items which deal with the individuals that make up the race, which must be explored.

Man has risen from his former lowly state simply because individuals, from time to time, have stepped out of the routine rut of their existence and attempted to do something that had not been accomplished before. This individuality when teamed with a companion trait, that of human gregariousness, leads to the formation of groups and the resulting group loyalties: family, tribe, church, labor groups, city, state, nation. Only because of these accretions of individuals around some central emotional cores has society been able to make those advances in the standards of living which can be accomplished by the applications of science by industry. Yet this very mass action itself inevitably tends to suppress that individuality which is the ultimate wellspring of advance. There is virtue — great virtue — in the rugged individualist; civilization can never move forward without him. Yet by his very nature he doesn't fit the mold of mass production or mass government or mass living. How can we keep the individuals, as well as the essential groups, all working in one direction without using all their energy and vitality on internal frictions that are always debilitating and occasionally catastrophic? I would suggest that one of the prime objectives of an educational system should be to seek an answer to that problem.

The Sense of Security. Both the traits of true individuality and group loyalty probably have evolved in the human nature for a single sound reason — the need for a sense of security. Those who were intent on achieving some modicum of security survived; the others didn't. It is quite common for persons of conservative political temper in this country to greatly

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AMERICAN EDUCATION

(Continued from page 336)

decry the tendency of the American public to put paramount importance on social security rather than to take a chance on rugged individual efforts, as in the good old pioneer days. The public certainly has the deleterious tendency to look to the government or the labor unions as Santa Claus and to submit to a great deal of regimentation, all in the name of security. Although I certainly decry many of the economic and social trends, I do not believe they are a mark of the decreasing moral and economic fiber in the American people. The truth probably is that the sense of security has been just as important in man for thousands of years as it is at present. Probably one of the greatest contributions of anthropologists has been the demonstration that all men put the greatest importance on maintaining individual control over their means of livelihood. In even the most communistic of the primitive societies man has always kept individual control over his weapons and his tools. The food he raised, the game he killed, even his wives might be considered community property but his fish hook, his spear, his bow and arrow were his and his alone. In the early cattle days in our own country, the open range was common property for all people to use, but the man who stole a horse was guilty of a capital offense.

In modern industrial life, however, man has suddenly come to realize that he no longer has control over the means of his livelihood. He does not own the machine tool at which he works nor the building in

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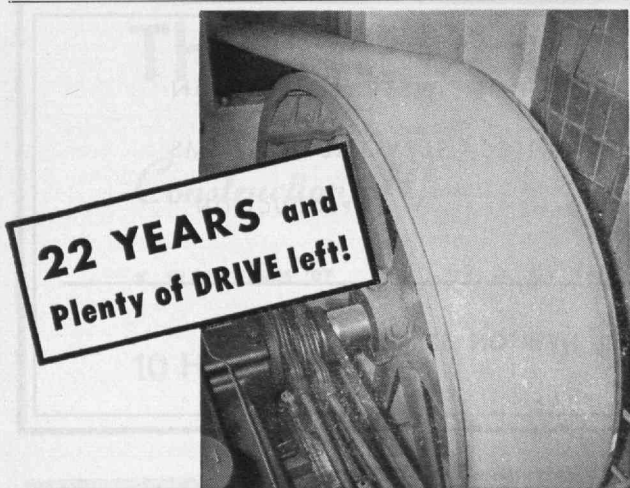
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which it is housed. His savings are taxed practically out of existence. His currency has lost its stable base of value, so that what he does acquire he may not be able to hold. Whereas his grandfather, a hardy pioneer who forged boldly into the wilderness, may have seemed a very daring and carefree person, actually grandfather's major yen was for security. He was looking for that distant piece of land which would always be there and always fruitful; a piece of land which would be his and his alone, where he would finish his days, cared for by his children and grandchildren and where he would be buried for his last long rest. This was all very important; it was the essence of security. His grandson finds himself working in a factory for an hourly wage, and, to a considerable degree, his very existence depends upon the whims of an employer or on the unpredictable trends of economic life. Just as his grandfather did, it is very natural indeed that he should seek security by whatever means he can. The means at hand, and the only ones which seem to make sense to him, are political action either through normal governmental channels or through union organization. Though many of the things that are transpiring at present may be socially undesirable, they should by no means be taken as prima-facie evidence of the weakening of the moral fiber of the human race. Until there is a full comprehension on the part of the leaders, as well as the people, of the universality and importance of this sense of security, I seriously doubt if we will be able to arrive at a reasonable solution of a number of our social problems.

(The concluding part of this article will appear in the May, 1950, issue of *The Review*.)



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THE TREND OF AFFAIRS

(Concluded from page 303)

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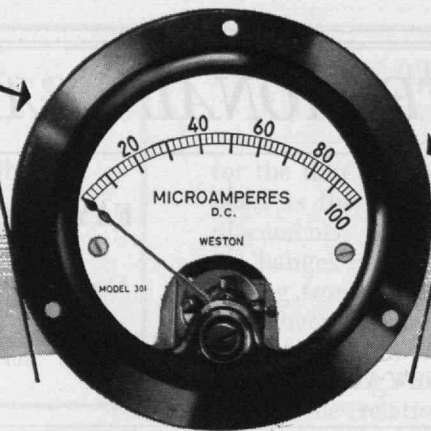
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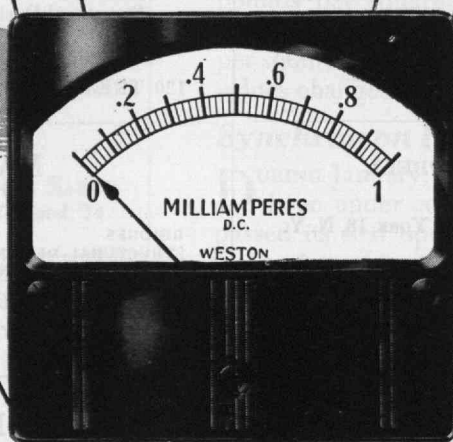
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Alumni AND Officers IN THE News

The Spoken Word

ALBERT C. WALKER'18 described research that has made possible the production of synthetic crystals for use in the communications and related electrical fields in a speech given at a meeting of the Cincinnati section of the American Chemical Society on January 11.

MILTON E. PARKER'23 spoke at the 14th annual Pest Control Operators Conference held at Purdue University in February.

F. ROLF MORRAL'32 was in Spain on January 24 where he spoke before members of the Spanish Iron and Steel Institute on "Industrial Research in the United States" and the following day gave a lecture on "New Developments in Materials Engineering." On February 2 and 3, Dr. Morral spoke at the University of Barcelona and at that time was made an honorary member of the Asociacion Technica Española de Estudios Metalurgicos.

Awards and Honors

WARREN K. LEWIS'05 has been chosen by his fellow engineers of the Engineering Societies of New England as the recipient of the New England Award for 1950. Presentation of the award will be made at the annual dinner meeting of the Societies this spring.

JAMES I. BANASH'06 was awarded the 1949 James Turner Morehead Medal "for his many years of stimulating inspiration, guidance, and encouragement of the acetylene industry toward higher safety achievements." Mr. Banash received the medal at the annual convention of the International Acetylene Association held in San Francisco, Calif., on March 27.

RALPH T. WALKER'11 received the Medal of Honor presented by the New York chapter of the American Institute of Architects at the chapter's 81st anniversary dinner held on February 21.

EDWARD P. WARNER'17, "for his pioneering research and a continuous record of contribution to the art and science of aeronautics," was presented with the Daniel Guggenheim Medal during the 70th annual meeting of the American Society of Mechanical Engineers held in New York November 27 through December 2, 1949.

The Printed Word

FREDERIC W. LORD'93 has seen the second edition of his book, *Contracting as a Profession*, published by Richard R. Smith with a foreword by WALTER C. VOSS'32, Head of the Department of Building Engineering and Construction at M.I.T. Mr. Lord's book is now required reading for students taking courses in building and engineering construction and allied subjects in 50 colleges throughout the country.

CLAUDE E. PATCH'02 is the author of "Cost Accounting as an Operating Tool" which appeared in the 1950 *Yearbook of the American Pulp and Paper Mill Superintendents' Association, Inc.*

JAMES H. MEANS'06 penned "England's Public Medicine: The Facts" published in the March, 1950, issue of the *Atlantic Monthly*.

RUDOLF E. GRUBER'16 wrote "Therapeutic Progress Through International Co-operation" published in *The Merck Report* of January, 1950.

ERNEST H. HUNTRESS'20 has compiled the "Centennials and Polycentennials of Chemical Interest During 1950." This paper was printed in the February, 1950, issue of the *Proceedings of the American Academy of Arts and Sciences*, Volume 78, Number 1.

WALTER C. SADLER'21 has written the book, *The Specifications and Law on Engineering Works*, published by John Wiley and Sons, Inc.

HENRY B. KANE'24 has illustrated some of the writings of Henry David Thoreau in a new book entitled, *The Maine Woods*, arranged with notes by Dudley C. Lunt and published in March, 1950, by W. W. Norton and Company, Inc.

CARROLL W. BOYCE, 10-44, is the author of the book, *How to Plan Pensions*, published in March, 1950, by the McGraw-Hill Book Company.

JOHN C. SLATER, staff, wrote *Micro-wave Electronics*, published by D. Van Nostrand Company, Inc., 1950.

TAPPI

A luncheon for M.I.T. Alumni was held at the Engineers Club in New York on February 21 in conjunction with the annual meeting of the Technical Association of the Pulp and Paper Industry. LAWRENCE H. FLETT'18 was chairman of the group and DAVID F. LOWRY'40 was in charge of arrangements. JOHN B. CALKIN'32 was elected chairman for the meeting next year. Besides the above, the following Alumni were in attendance: ALLEN ABRAMS'15, EDGAR C. AHLBERG, 6-45, ANGELO M. ALTIERI'29, EARL F. ANDERTON'32, JOHN P. BAINBRIDGE, Jr., '35, SOLOMON BAKER'39, HERMON T. BARKER'27, WILLIAM BAUMRUCKER, Jr., '29, CLYDE A. BENSON'22, FREDERICK W. BINNS'21, J. ROBERT BONNAR'27, GEORGE FREY BROUGHTON'36, SIDNEY A. BROWN'28, ELMER R. BURLING'30, JOHN BUSS'26, ROBERT F. CHARLES'26, SAMUEL CLAYMAN'17, C. GEORGE DANDROW'22, HENRY S. DIMMICK'22, MARVIN H. DIXON'27, ROBERT T. EMERSON'32, SAXTON W. FLETCHER'18, HOWARD S. GARDNER'30, PERCIVAL P. GOODING'16, NORMAN L. GREENMAN, 2-44, RUDOLPH T. GREEP'34, CLAYTON D. GROVER'22, LYLE C. JENNESS'37, R. M. KARAPETOFF COBB'23, WILLIAM L. KEPLINGER, Jr., '24, ALBERT C. LAMOUREUX'26, JOHN H. LENAERTS'12, ROBERT D. MCCARRON'30, KENNETH J.

MACKENZIE'28, ROBERT B. MACMULLIN'19, DOUGLAS H. MCMURTRIE'15, SIMON MALKIN'34, RICHARD S. MOONEY'47, GEORGE E. NILES'40, A. ABBA ORLINGER'21, JOHN L. PARSONS'17, RICHARD P. PRICE'25, ROBERT J. PROCTOR'28, JOHN P. RICH'30, ANTHONY R. SAVINA'30, MILTON O. SCHUR'16, PAUL J. SHIRLEY, Jr., '38, WILLIAM S. SPILLER'48, J. NEWELL STEPHENSON'09, FLETCHER P. THORNTON, Jr., '36, JAMES S. THORNTON'41, PETER G. VOLANAKIS'42, GEORGE R. WADLEIGH'97, BLANCHARD D. WARREN'24, and PYAM W. WILLIAMS'36.

Obituary

AMY BARNES MAYNARD'84, in 1949.
SAMUEL H. MILDRAH'89, January 18.
EDWARD C. CLARK'92, December 27.*
JOHN D. HILLIARD'92, June 19.*
FRANK DRAKE'94, January 14.
EDWIN M. CHAPMAN'95, date unknown.*
GORDON L. FOWLER'95, December 30.*
FRED E. SHARP'95, September 23.*
GEORGE B. WELLING'95, December 29.*
WILLARD H. COLMAN'96, September 3.
FRANK A. HOWARD'96, February 6.*
CHARLES G. HOWE'96, November 21.*
ALBERT E. SMYSER'96, December 15.*
ROBERT M. DRAPER'98, February 18.
FREDERICK KLEINSCHMIDT'98, in April, 1949.*
REGINALD S. TOBEY'98, January 23.
MARGARET STANNARD'00, October 30.
CHARLES W. CURTIS'01, May 31.*
J. RUSSELL PUTNAM'01, January 16.*
EDWARD G. THATCHER'01, February 16.
ALBERT W. KIMBALL'03, January 4.*
ARTHUR P. RICE'03, date unknown.*
IDA A. RYAN'05, February 17.
HARRY H. WEST'05, February 4.
HARRY C. ARNOLD'07, September 24, 1947.*
ERNEST F. LEWIS'07, January 18.*
RODNEY C. CARYL'08, December 17.
LINCOLN R. SOULE'08, January 31.
EDWARD T. ALMY, Jr., '09, January 4.*
STILLMAN BATCHELOR'10, January 23.
WILLIAM H. BAXTER'12, January 20.
FRANCIS T. McAVOY'12, January 16.
GEORGE H. JONES'13, January 23.*
GEORGE H. STARR'13, January 1.*
JOHN P. NEWBURY, Jr., '14, February 2.*
GORDON U. STEWART'14, December 18.*
ERNEST W. WESCOTT'14, January 14.*
CHARLES S. BOUGHARD'15, January 31.
KENNETH HUSE'15 February 4.
JOHN R. FARRAR'16, February 4.*
J. CARL FISHER'17, January 10.*
HAROLD V. KALER'18, November 29.*
ARTHUR E. GRIFFIN'19, February 25.
WILLIAM E. DALEY'22, February 1.
LLOYD S. BECKET'23, January 19.*
FRANK R. HASSLER'23, January 31.
BREES J. STEVENS'23, March 1.
RALPH P. ROBINSON'27, December 18.
PAUL C. SPRINGER'27, March 6.
PAUL KEOUGH'30, September 6.
JOHN A. MILLER'35, September 10.*

* Mentioned in class notes.

News FROM THE Clubs AND Classes

CLUB NOTES

M.I.T. Club of East Tennessee

The annual meeting of the Club was held on March 1 at the Whittle Springs Hotel in Knoxville. Twenty-four members and wives were present. We were fortunate in having with us for this occasion H. E. Lobdell'17, Executive Vice-president of the Alumni Association, who told in most interesting fashion the latest activities in Cambridge.

New officers for the Club were elected at the meeting. Our new President is Carl S. Helrich'18; Secretary, A. C. Jealous'42; Treasurer, D. M. Wood'06; and Vice-presidents, R. B. George'23, A. T. Regan'33 and F. C. Roth'42. With the new group of officers, the center of club activity shifts from Knoxville to Oak Ridge. Other Alumni at the meeting were: W. P. Bealer'17, R. D. Birkhoff'45, G. W. Bergman'27, F. A. W. Davis'15, G. E. Farmer'22, R. E. Frierson'29, V. M. Hare, Jr.'23; E. B. Jennings'25; and A. G. Kern, Jr.'34. This Secretary, writing his final notes, was unable to be present but did find it possible to spend several very pleasant hours with Lobby on the following day. — GEORGE P. PALO'28, *Secretary*, T.V.A., 202 Union Building, Knoxville, Tenn.

M.I.T. Club of Florida

Paul M. Chalmers' trip to the Southland brought together a group of Alumni from Jacksonville and the Club's Secretary from Gainesville. Those attending the dinner meeting, which was held at the Seminole Hotel, Jacksonville, on December 1, included the following: Guy W. Gilleland, Jr.'45, Gerald M. Keith'12, John W. McDonough, Jr.'43, Charles E. Richheimer'28, Tinsley W. Rucker'31, George W. Simons, Jr.'15 and Francis H. Yerkes'40. Professor Chalmers gave an interesting account of his work in contacting preparatory schools and prospective students and of his work with the foreign students at the Institute. President Simons introduced the speaker.

Several of the Gainesville Alumni who could not attend the meeting have suggested an informal get-together locally and such a gathering will probably be held in Gainesville sometime this spring. — GERALD M. KEITH'12, *Secretary*, Post Office Box 2695, University Station, Gainesville, Fla.

M.I.T. Club of Panama

The Club held a daylong outing on February 5 at "El Cortijo," the home of Fernando Eleta'47 at Cermeño, approximately 40 miles from Panama City. A fine time was had by all who attended and a

dinner of real Panamanian food was served through the efforts of Eduardo Icaza'23, President of the Club. As usual, everyone expressed a desire to have more frequent meetings.

Those attending were: James R. Hawkes'19, Kenneth V. Hill'21, I. F. McIlhenny'23, Eduardo Icaza'23, E. G. Bromilow'26, C. O. Glisson'29, Lewis B. Moore'26, C. W. Chase, Jr.'34, Richard R. Brown'35, Gilberto S. Calderon'35, Carlos J. Fabrega'35, Francisco Morales'39, Jaime Berrocal'47, and Fernando Eleta'47. — CONSTANT W. CHASE, JR.'34, *Secretary*, Box 77, Balboa Heights, Canal Zone.

The M.I.T. Club of Quebec

At a midwinter dinner meeting held at the Berkeley Hotel in Montreal on February 8, our guest and speaker was the Honorable Robert H. Winters'33, Minister of Resources and Development for the Canadian Government. Mr. Winters gave us an interesting talk on the role of the engineer in public life, stressing the need of more engineers to tackle the problems of public affairs, whether it be in the municipal, provincial or federal fields.

The attendance was 44 and included the following members: G. C. Anderson'42, H. A. Audet'45, C. P. Beaubien'34, P. F. Beaudry'21, M. E. Blanchard'48, A. E. Bourbeau'27, T. L. Brock'38, E. C. Brown'40, J. A. Campbell'36, C. S. Carter'28, H. S. Chandler'08, Aime Cousineau'16, L. A. Fraikin'31, F. L. French'39, Henri Gaudefroy'34, E. N. Gougeon'25, S. J. Hungerford'33, Paul Kellogg'11, J. L. E. Langevin'30, Rene Laplante'30, Jacques Laurence'40, G. R. Laurion'25, G. K. Marshall'41, Huet Massue'15, F. D. Mathias'36, M. W. Maxwell'23, J. H. Michell'41, Sol Nathanson'40, W. J. Pead, Jr.'11, H. C. Pearson'23, J. R. Portelance'37, H. A. Rapelye'08, J. M. Raymond'34, A. D. Ross'22, L. J. Seidensticker'98, A. T. E. Smith'21, R. S. Sproule'47, D. J. Spence'97, J. N. Stephenson'09, T. E. Warren'30, G. L. White'23, H. R. Wiggs'22, R. H. Winters'33; also a guest: H. R. Rice. — JACQUES R. LAURENCE, *Secretary*, 1430 St. Denis Street, Montreal 18, Quebec, Canada.

M.I.T. Club of St. Louis

After an overextended period of inactivity, the Club got together on January 19 for its annual meeting. While it has been customary to schedule the annual meeting in November, it was thought best to delay the meeting for last year in view of possible conflict with the plans of the local Committee on Financing Development. The local committee, headed by Homer Howes'02 and Frank Mesker'27, has been active for several months. A series of committee meetings have been held and a dinner was arranged in October at which Dr. Killian was introduced

to prominent St. Louisans. The January 19 meeting, held at the University Club, was primarily for the election of officers, but a number of the members stayed to play cards and to renew acquaintances. The following were elected to office: Eugene S. Weil'21, President; Irvin R. Mitchell'30, Vice-president; John E. Taylor'46, Secretary-Treasurer; Francis A. Mesker'27 and John D. Sweeney'33, Board of Governors.

In addition to the above, the following Alumni were present: John T. Ellsworth'08, Leon L. Katzenstein'13, Herbert C. DeStaebler'21, Lester B. Leighton'24, Abraham Silverman'27, Arthur W. Baker'26, Robert J. Joyce'28, Edward A. Fulton'30, retiring president, David Q. Wells'30, Wendell E. Bearce'32, Milton P. Mindel'34, John S. Wood, Jr.'34, Milton Lief'37, Ira H. Lohman, Jr.'38, Alvin M. Mendle'39, Ralph M. Chambers, Jr.'40, Walter Helmreich, Jr.'40, Arthur L. Lowell'41, Larry P. Russe'41, Robert W. Keating'42, Eugene W. Place'43, Wilhem A. Hanpeter'46, James B. Pickel'46, Arman F. Frederickson'47, Oliver W. Hamilton'47, Hugh B. Morrison'48 and Robert W. Hanpeter'48.

After a lapse of six months between meetings, it was a pleasant surprise to learn that Norbert Wiener, Professor of Mathematics at the Institute, was coming to St. Louis and that Dave Wells had offered to give an informal reception at his home on January 30. Dr. Wiener visited with his sister, Mrs. Bertha Wiener Dodge'22 while returning to Cambridge from Mexico City and very kindly offered to address the alumni group here. In spite of a sudden spurt of bad weather, approximately 100 Alumni and wives turned out to partake of Mr. and Mrs. Wells' generous hospitality and to meet the Professor. Dr. Wiener delivered an informal talk on his present work which excited considerable interest among the Alumni as evidenced by the question period that followed. As a side light, our distinguished visitor drew a great deal of newspaper publicity which in turn led to the discovery of several Alumni who we did not know were in the vicinity. Everyone had a fine time and no doubt derived renewed appreciation of the work that M.I.T. is carrying on in the field of basic science. — JOHN E. TAYLOR'46, *Secretary*, Haynes and Koenig, 818 Olive Street, St. Louis 1, Mo.

M.I.T. Club of Schenectady

At this writing, we have a luncheon meeting planned to gather together Alumni in the Schenectady area for informal discussion and camaraderie. Joseph Rotundo, Professor of Economics at Union College, will speak to our group on "Issues Behind the Coal Strike."

Somewhat removed from our usual luncheon topics, but still of considerable interest to many of our members, will be news of some of the old timers and their

activities. P. L. Alger¹⁵ writes the following: "There are in Schenectady a number of M.I.T. graduates of many years ago, now retired, who are active in interesting ways. One who has a most fascinating hobby is Karl A. Pauly⁹⁶, who says that he cannot understand how he ever found time to work in his earlier years, since he has found so many pressing things to do since his retirement. Mr. Pauly, being forced to give up golf by physician's orders some years ago, took up the study of fossils, at first those found locally and later those from wider areas. This brought him into contact with the Albany Museum authorities, and directed his attention to some of the unsolved problems of the ice ages, and the causes of the advances and retreats of the ice sheets. This in turn led him to study the records of terminal moraines from all known ice ages, and the relations between their altitudes and the latitudes in which they are found. Knowing from present-day conditions the curve relating the least altitude of a glacier to the latitude, which varies from sea level at the poles to about 20,000 feet at the equator, he was led to compare this with the records of earlier ice ages. He then found, by assuming that the north and south poles have wandered over the map of the world in the course of ages, he could locate an approximate center for the poles corresponding to each ice age—such that the same curve of altitude of glaciers versus latitude held true, as is true today. From these and many other studies he is developing a very interesting theory of the causes of the ice ages, which ties in with suggestions made by Dr. Eddington years ago."

Several new Alumni have moved to the area. Members of the Class of '49 are: John H. Redpath^{3d}, Robert W. Rockwell, James T. Madden, Thomas A. Bohanske, Donald E. Ridgley, and William W. Smith. — WILL B. RODEMAN, 2-44, Secretary, General Electric Company, Building 81, Schenectady 5, N.Y.

M.I.T. Club of Southern California

H. W. Geyer²⁶ was recently honored, upon completion of several years as chairman of the American Gas Association Committee on Approval Requirements for Gas Heaters, by the presentation of an engraved plaque signed by the 12 members of that committee. Geyer's increasing duties in the Southern Counties Service Department have caused him to release many of his public offices and his wise counsel will definitely be missed.

The affairs of the Club are the brightest for years. The Development Program office in Los Angeles has made constant contacts with 100 or more Alumni active in this work. In turn, these men have each seen an average of six Alumni, resulting in personal calls on approximately 600 men in this area during the first two months. Row²³ has suggested that the organization be continued and used for getting out attendance for meetings and ascertaining the wishes of the majority on any subject without the large mailing expense incident with our mailing list of approximately 1,200.

The request for 1950 dues has not been made but 15 men have paid, according to the latest report of George M. Cunningham²⁷, Club Treasurer. As a letter is sent to all Alumni coming into this area as soon as notice is received from Cambridge or from some friend, many of the newcomers take care of their dues before the long-time residents. The present good cash balance, however, is largely due to the generosity of the standbys who have sent a gift for improvements with their dues. The best gift of this kind in 1950 came from Lynes⁴⁹, II, but the year is young.

The production of a new directory will be aided greatly by the use of the cards corrected by the Development Committee in their three months' work, and their general co-operation has been much appreciated. — A special meeting during the summer vacation has been suggested for the students now in attendance at Technology whose homes are in this area. There are approximately 50 students in this category, and some of them are the sons of M.I.T. men. — Information of all Alumni from this area who died in World War II is desired from their relatives. This applies also to those who served in the Allied forces. Their names are to appear on a memorial on the north wall of the lobby of Building 10. — HIRAM E. BEEBE¹⁰, Secretary, 1847 North Wilcox Avenue, Hollywood 28, Calif.

M.I.T. Club of Southern Texas

A meeting of the committee on constitution and by-laws was held on the evening of October 27. This committee was named by Irwin W. Alcorn²³ at the dinner for H. E. Lobdell¹⁷, Executive Vice-president of the Alumni Association, on February 22, 1949. Those present were: Irwin W. Alcorn²³, chairman, Richard T. Lyons¹⁷, Thomas H. Jenkins³², Joseph R. Mares²⁴, Duke Selig³³ and Joseph H. McEvoy²¹. Both Alcorn and Jenkins submitted preliminary rough drafts of constitutions; and, point by point, these were considered, bringing them a unified single constitution for presentation at a suitable time to the membership at an alumni function or by mailing. It was the desire of all present to bring the matter to an early conclusion; but two tries to do so were unsuccessful due to the closeness of the holidays. Another meeting on this subject is anticipated in the near future. The meeting was held in the Houston Club and Joseph R. Mares was our host at the savory and enjoyable dinner that followed the meeting. Duke Selig arrived a few minutes late but was excused after he announced that he had, on that very afternoon, become the father of a very cute little baby girl.

A number of meetings were held by the members of the Development Program committee to complete the details of the dinner in honor of Warren K. Lewis⁰⁵ on February 23. Dr. Lewis is professor emeritus of Chemical Engineering at the Institute. The following item was issued by the committee to the local newspapers: "Richard T. Lyons, vice-president of the Tide Water Associated

Oil Company, has been named chairman of a Massachusetts Institute of Technology committee to work with alumni in and around Houston, which is taking part in the institute's program of expansion and development in various important fields of science and engineering. . . . Mr. Lyons, a graduate of M.I.T. in the class of 1917, has recruited his committee from other alumni. A partial list of his fellow workers includes Irwin W. Alcorn²³; Kemerton Dean¹⁶; Henry Flynn²³; Kenneth Franzheim¹³; Thomas H. Jenkins³²; Joseph R. Mares²⁴; Joseph H. McEvoy²¹; George B. Morgan²⁰; Joseph E. Russell²⁵; and Duke Selig³³. . . ." — JOSEPH H. McEVoy²¹, Secretary, 202 McGowen Avenue, Houston 6, Texas.

Washington Society of the M.I.T.

We were very fortunate to have as our speaker at the February meeting the Honorable John McSweeney, Congressman from Ohio, whose topic was, "European Conditions Today: What Should We Do About Them?" During the past summer, Mr. McSweeney toured all the European countries receiving Marshall Plan help. He made this tour at his own expense; and, since he is an excellent speaker, his report on conditions as he found them was most interesting. He pointed out that he told the people he talked to that they should make every effort to re-establish their economies as soon as possible since Marshall Plan aid will stop in 1952.

The question and answer period following Mr. McSweeney's talk was most interesting. Mr. McSweeney stated that in his opinion, Hitler is still alive. He gave a number of arguments to support this opinion. Mr. McSweeney was asked when the House Rules Committee was going to do something about the National Science Foundation Bill. He replied that he and a number of others of the House Rules Committee were holding up the bill because they did not approve of the government incurring any additional expenses at this time if they could be avoided. The final opinion that Mr. McSweeney expressed was that if the Russians resume the Berlin blockade, we should not resort to the airlift but rather maintain communication lines by force if necessary.

Our meeting on March 9 was again scheduled to be held at the Willard Hotel. Massachusetts' own Senator Saltonstall was our speaker. — JOHN ADE PLUGGE²⁹, Secretary, 35 Oxford Street, Chevy Chase 15, Md. ALBERT F. BIRD³⁰, Review Secretary, 5070 Temple Hills Road, Southeast, Washington 20, D.C. JOHN W. SHEETZ⁴², Assistant Review Secretary, 3068 South Woodward, Fairlington, Arlington, Va.

The M.I.T. Club of Western Pennsylvania

The Club met at the University Club in Pittsburgh on January 19 for its regular monthly meeting. After a pleasant hour with the stein, dinner was served at

7:00 P.M. At 8:15 P.M., the meeting was called to order by our President, George Hoffman'28. The minutes of the December meeting were read and approved. The after dinner program was devoted to the natural gas industry. A film, "The Story of Natural Gas," was shown by the Peoples' Natural Gas Company. This film showed the drilling for, the transmission of, and the many uses for natural gas. Mr. Pijowski and Mr. Love of the gas company gave additional information on natural gas, and led quite a lively discussion on the comparison of gas and electricity where they are used for similar purposes, such as for heating. After this film and discussion a second film was shown which depicted the laying of the gas lines from the Texas and Oklahoma fields to the industrial areas of Ohio and Pennsylvania. Of particular interest was the way in which these pipes were welded and placed in the trenches and over the bridges.

The following members were present at the January meeting: A. J. Abrams'24, C. T. Barker'27, W. J. Bates'35, E. J. Cole'44, D. B. Demond'18, B. K. Duffy'41, G. M. Hoffman'28, L. K. Johnson'43, Herbert Kay'47, R. G. Lafean'19, J. W. Logan, Jr.'20, A. T. Mason'33, C. H. Mohr'33, G. A. Morrison'09, A. H. Orr, Jr.'32, A. K. Redcay'34, F. G. Richards'34, Henry Rockwood'32, W. F. Schaefer'48, E. A. Soars'21, P. R. Toolin'39, F. R. Winslow'51. — GEORGE C. MORRISSETTE '35, *Secretary*, 469 Mapleton Avenue, Mt. Lebanon, Pittsburgh 28, Pa.

Worcester County Alumni Association of M.I.T.

One of the most outstanding meetings in recent years was held on January 30 at the plant of the Norton Company in Worcester when more than 100 members and guests enjoyed a fine roast beef dinner in the plant cafeteria. After a short business session, at which Mac Levine'25, President of our Association, presided, the meeting was adjourned to Norton Hall where we were entertained by a series of talks and demonstrations and by a movie, all on the various products made by the company. Ralph F. Gow'25, Executive Vice-president of the company, who was in charge of the meeting, extended greetings to the Club and introduced Wallace T. Montague who acted as master of ceremonies. Mr. Montague, who is a vice-president of Norton's, outlined the history of the abrasive industry and Norton's part in that history and also gave an outline of the many products manufactured by the company and several new products in the development stage. Products manufactured by the Norton Company include grinding machines, abrasives, including the original aluminum oxide abrasive, alundum, and refractories. Abrasives are used not only for grinding and polishing, but also for non-slip aggregate for floors and steps, and for abrasion resistant products.

The first speaker introduced by Mr. Montague was Walter G. Johnson of the machine division who spoke on "Twin-Flo Grinding" a new method of grinding which utilizes separate jets of oil and

water for lubricating and cooling rather than the usual single jet of a mixture of the two materials. The next speaker, O. J. Whittemore, Jr., acquainted us with the high-temperature refractories produced by Norton's. Some of these products can be used at temperatures exceeding 4,000 degrees F. T. S. Green, Jr., then spoke on abrasion resistant materials including "Norbide" a new Norton material made of boron carbide which shows much promise. The next presentation was a skit under the direction of Fred L. Curtis on "Everyday Uses of Norton Abrasives." The skit was most entertaining, and demonstrated very graphically that most of the things we use every day involve the use of abrasives directly or indirectly at some stage in their manufacture. The program was completed by a motion picture on "32 Alundum" a new abrasive which has much sharper grains than those previously made. The picture showed how the material is manufactured, and also showed its use in grinding operations where it permits faster grinding and reduces work temperature. After the showing of the movie, the meeting was adjourned and we were invited to view the many exhibits that had been set up in the hall. The members found the exhibits so interesting that many stayed nearly an hour after the meeting was over.

Among the Alumni present were: Edward Earl'91, Carleton A. Read'91, H. M. Latham'93, Edgar W. Norton'98, William A. Wilder'98, Herbert S. May'02, Harry S. Kendall'04, Frederic E. Banfield, Jr.'07, Philip B. Walker'07, Orville B. Denison'11, Stanford H. Hartshorn'11, H. L. Robinson'11, Lewis Davis'12, R. F. Zecha'14, Lewis S. Vose'16, Fred H. Bartlett'18, Ralph G. Mahony'18, Roderic L. Bent'19, Maurice E. Goodridge'19, Frederick S. Britton'20, Frank Maconi'20, Ernest P. Whitehead'20, Robert H. Brown'22, Fred N. Dillon, Jr.'22, Kenneth G. Merriam'22, Wendell F. Burbank'25, Chester P. Currier'25, Ralph F. Gow'25, Max Levine'25, C. A. Ellis'27, Robert N. C. Hessel'27, R. M. Peirce'27, Robert J. Proctor'28, Robert S. Pride'29, T. A. Dourdeville'30, W. M. Wheildon'30, D. Jack Allia'31, O. Mason Burrows'31, Robert H. Haberstroh'31, A. E. Jorjorian'31, K. H. Volkhausen'31, Howard F. Atwood'32, W. S. Crowell'32, Frederick E. Mader'32, Russell C. Pratt'32, Charles S. Reasby'33, W. Franklin Baxter, Jr.'34, Gregory M. Korjoff'34, Philip B. Walker, Jr.'34, Robert G. Clarke'35, Arthur J. Lariviere'35, Arthur F. Fiddes'36, John M. Gould'37, T. R. Kinraide'37, Leo P. Tarasov'37, Howard Ness'38, David L. Sargent'38, Jack T. Wilber'38, George R. Blake'39, James W. Dopp, Jr.'39, Stanley C. Johnson'39, Kenneth D. Roberts'39, Charles H. Strang'40, William G. Scola'43, Gardner L. Bent'44, Warren H. Howard'44, H. M. Taft'44, Donald M. Whitehead'45, John A. Twomey'48, Richard H. Harris'48, Joseph D. Pigott'49, and Harrison N. Thibault'49.

Our next meeting was scheduled for March 20 when D. V. Brown and J. M. Scanlon were to speak to us on "Labor-Management Problems." — DONALD M. WHITEHEAD'45, *Secretary*, 464 Salisbury Street, Worcester 5, Mass.

CLASS NOTES

• 1886 •

Not hearing from the members, the Secretary has had to fill up his "stick" with his own matters, which are anything but interesting to him, whatever value they may have in the minds of those who read them. The present copy, prepared in February, concerns the visit of the Secretary to the Technology library on the 16th of that month, and his search through the card catalog for evidences of the mental alertness of his classmates. Ten of the 27 have their names preserved in the archives—in large measure for their immortal graduation theses! If I had had the time to delve into the records of those who have passed on, doubtless the list would have had no less a percentage of the total '86 Alumni, past and present, represented in the catalog than the proportion reported above. Of the 10, Ingalls leads with 12 items while Clifford, the next highest, has 7 items; Batcheller has 4, Duff 3, and the rest 1 item each with the exception of Herrick with 2. Batcheller's list is interesting as it has two items of a literary or social nature: "Features of the Green Mountains" and "People of Wallingford, Vermont." Of course, there must be many other products from the pens of '86 than those recorded here. Why not hunt them up and send copies to the library?

The way to the library from the main building is as difficult of access as was the abode of the spider in the familiar poem of "The Spider and the Fly," and there are as many "wondrous things" to see when one gets there. Not realizing that the transfer of the general catalog to the new building had been made, I went up to the dome in the main building, only to find it reserved for a relatively few departments. Receiving instructions as to the new location, I proceeded down to the main floor and along the passageway toward the Walker Memorial Building as far as I could go (say, 2 miles), turned right and followed the passage toward the river as far as I could go (2 miles miles more), turned left for half a mile and up four flights to the second story, and there I was! There are rooms and rooms and still more rooms beautifully lighted and equipped with desks, tables, chairs, and card files and book racks galore with attendants to get you your pick from the card catalog. The getting in, however, is nothing to the mystery of getting out. I got completely lost and wandered round for another mile before I summoned up courage to ask to be put out! Certainly the distance required to be covered in proceeding from the farthest-most corner of the new Rogers Building to the corresponding farthest-most corner of the new library building is vast with a large V. — ARTHUR T. CHASE, *Secretary*, Post Office Box 4, Island Creek, Mass.

• 1892 •

The Secretary has received news of the death of Edward C. Clark in Sandwich,

Mass., on December 27. Clark was a student with us in Course IV. The following from the Cape Cod *Standard Times* gives a brief outline of his career. He was born in Washington, the son of Edward and Evelyn (Freeman) Clark. After attending the Institute he became a sanitary engineer by profession working with Warner Chapman and Farquhar in New York City. Later he operated his own business in New York under the firm name of Swinbourne and Clark. Still later he moved to Sandwich, where he entered the employ of the Keith Car Company, remaining with the company until the plant closed. He retired at that time and has since resided in Sandwich. In October, 1904, he was married to Mary A. Freeman who died in 1925. He is survived by two nieces, Mrs. Evelyn C. Pratt of New York and Miss Charlotte S. Clark of Washington. — The Secretary has also received notice of the death of John D. Hilliard at his home in Glens Falls, N.Y., on June 19. He graduated with us from Course IV but the Secretary has no further information regarding his career.

Ober and the Secretary represented the Class at the Midwinter Meeting of the Alumni Association at the Walker Memorial on February 4. This was the 75th Jubilee of the Alumni Association and 700 persons were present. Dr. Compton spoke of his return to Institute activities and outlined some of his experiences with the Department of Defense. President Killian gave a comprehensive report of recent accomplishments and plans for the future expansion of the Institute. Marshall Dalton '15, general chairman of the M.I.T. Development Program, announced the recent gift of \$1,000,000 to provide facilities for research in the field of food processing and development, a field in which our fellow alumnus, Samuel C. Prescott '94 has been taking a leading part. The feature of the evening was a very interesting demonstrated lecture by Larry F. Livingston of the DuPont Company, illustrating some of the newest developments in chemical research as applied to the production of nylon, cellophane, and many other products turned out as the result of years of research in the laboratories of the company. — CHARLES E. FULLER, *Secretary*, Box 144, Wellesley 81, Mass.

• 1893 •

At the annual meeting of the stockholders of the Norfolk County Trust Company, our loyal classmate and 2d Vice-president, Jesse B. Baxter, was elected to the board of directors of the bank. As a lifelong resident of Milton, he has been a prominent member of the town's civic and banking affairs, having served for 38 years as president and director of the Blue Hill Bank and Trust Company which was merged with the Norfolk County Trust Company in May, 1949.

The Canton *Journal* and the Quincy *Patriot-Ledger* tell us that Baxter has acted as treasurer for numerous civic campaigns, served the town of Milton as selectman, water commissioner, town treasurer, member of the planning board and

and is now a town meeting member. He is trustee of the Boston Five Cents Savings Bank, treasurer and manager of the Cunningham Foundation, treasurer of Swift Charity and vice-president and director of the Bunker Hill Monument Association. — FREDERIC H. KEYES, *Secretary*, Room 5-213, M.I.T., Cambridge 39, Mass. GEORGE B. GLIDDEN, *Assistant Secretary*, 38 Chauncey Street, Boston 11, Mass.

• 1895 •

We are indebted to Eddie Alden of New London, Conn., for the information that Frederick Kleinschmidt, who started with our Class and finally received his degree with the Class of '98, passed away in April, 1949. He was born in Cincinnati, Ohio, and graduated from the Woodward High School in 1890. His father being unable to give him the financial aid to further his education, his life became an increasingly unhappy one for him to carry on. To prepare himself for Technology he worked and studied for a year, and then entered M.I.T. in Course VI (Electrical Engineering). During his school years, he supported himself by working as a reporter on the Boston *Herald* and Boston *Globe*; eventually became a night editor but managed to carry on with his studies until the latter part of his fourth year. He found that he could not perform his laboratory work and, thus, failed to get his degree. Shortly thereafter, he suffered a nervous breakdown, which proved to be of a recurring nature, and this condition remained with him during his life. The unbelievable long hours he worked, combined with the disappointment of losing his degree were too much for him. However, he returned to Technology and enrolled in Course IX (General Engineering) taking special subjects in '96, '97 and '98, and finally graduating with the Class of 1898.

For reasons of his own, he absented himself from class affairs, and our roster never had a mailing address. He did an outstanding job of publicity for Technology in connection with the French and German Plays and all of the football activities. He served on the *Technique* Electoral Committee, Secretary-Treasurer of the Electrical Engineer's Society, and was a member of the Deutsche Verein. During his later years he returned to Cincinnati, conducting an advertising agency. One by one he dropped his friends. He was never married. His parents and sister died some years before he passed away in the Ohio Institution for Tuberculosis. Class of 1898, please note.

George Bertram Welling of North Bennington, Vt., passed on December 29, 1949. After graduating from the Riverside Academy in Poughkeepsie, N.Y., he entered the Institute, Course X, and left our Class in 1893 to enter the paper business. He became proprietor of the Stark Paper Company. During World War I, he was food administrator for Bennington County, and in the Vermont flood of 1927, was in charge of restoration of highway and bridge damage. He was a member of the prudential committee of the North Bennington school for more than

25 years and served as moderator of both the village and school districts. He was a incorporator and director of the Bennington County Savings Bank, before it became a branch of the Vermont Savings Bank, and was former vice-president and director of the First National Bank of North Bennington. He was a charter member of the Bennington Club, director of the Y.M.C.A. and the Olin Scott Fund, and for many years was in charge of the Salvation Army campaign for funds in the area. He is survived by his wife and three sons.

We learn that Fred Eldredge Sharp passed away at his home in Whitman, Mass., on September 23, 1949. Sharp was with our Class during 1891 and 1892. He had been the town clerk in Whitman for many years. George Gould Greene has changed his residence from Aldershot, Canada, to 314 Northeast 15th Avenue, Ft. Lauderdale, Fla. The Alumni Register informs us that Gordon L. Fowler died on December 30, 1949. Fowler was with our Class during 1891-1892, and was registered in Course VI. For quite some time, he was with the Western Electric Company at Chicago, Ill., and came east to New Jersey about 1929 and remained there until his death. The postmaster at Intervale, N.H., advises that Dr. Edwin Morton Chapman passed away several years past. We had record of his home being in Intervale since the year 1939; but since then, we have had no direct communication with him. He was at Technology during 1891-1892; then followed a time at Harvard University, finally receiving his M.D. degree from Columbia University in New York. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

• 1896 •

The annual Midwinter Meeting of local Boston Alumni took place on February 4 in Walker Memorial. The program for this meeting was distributed by mail. Those present were: Fred Damon, Bob Davis, James Driscoll, Henry Grush, Perry Howard, J. A. Rockwell, and F. T. Rundlet. Those called but unable to attend were: H. Hedge, Ralph Henry, G. S. Hewins, Herman Lythgoe, E. S. Mansfield and M. Pierce. All those present seemed to be in good health and to be prospering. Mr. Dalton announced the \$1,000,000 gift by the Campbell Soup Company amid great applause. The Dorrance Laboratory is to be built and biological and food technology will be studied there. The total amount subscribed to date toward the \$20,000,000 drive was announced as \$8,800,000.

We all discussed the Charles E. Locke Memorial Fund; which, as of February 3, 1950, represents \$11,003.31. This fund in honor of Charlie will be formally considered on and after January 1, 1951. The following resolution was passed on April 2, 1949, at the meeting at the Engineers Club in Boston: "On and after January 1, 1951, to meet any possible contingency after the class organization of 1896 may have passed out of existence, this fund, both principal and interest, is to be relinquished to the Massachusetts Institute of

Technology, to be used in any way that the Administration may see fit, and without any restrictions whatever. It is, however, hoped that unless some catastrophe or emergency should arise, it will be continued as an 1896 scholarship fund with the further provision that if future repayments of awards should tend to increase the principal of the fund, all out of reason, these payments may be considered as income, and, thus available for additional awards. The amount of this fund which is in the hands of the Institute Treasurer, amounts to \$10,391.31. The matter of a memorial fund in honor of Charles Locke was considered, and it was voted that this fund be known as the Charles E. Locke Memorial Fund, as of this date."

The dinner on February 17 as planned by the New York branch of the Class came off on schedule at the President Tavern. John Tilley acted as toastmaster, as usual, and those present included: Bakenhus, Fred Damon, Dorrance, Hall, John Rockwell, Sager, and Trout. General topics were discussed and perhaps the most important was our 55th anniversary in 1951. There seemed to be some question of the advisability of returning to East Bay Lodge. Some of those present thought that the food and general appointment were not up to standard. This matter will be taken up at a later date and such information as we have to distribute following similar discussions will be spread to the Class through the '96 notes in *The Review*. Suggestions for a location will be appreciated.

We have a new address for Frederick W. Bartlett at Old Harbor Road, Chatham, Mass. Mrs. Frank S. Churchill is now at 15 Craigie Street, Cambridge 15, Mass., and a card from Hattie L. Gates, who was pleased to receive her copy of *The Review*, gives her winter address as the Altamonte Hotel, Altamonte Springs, Fla. It is pleasant to hear from Charles Hyde out in Berkeley, Calif.; his card reads: "I am well, indeed, and doing just enough to keep out of mischief. I go to my office mornings and play hookey in the afternoons. I often think of you and our days together at M.I.T."

The Secretaries regret to report three deaths this month. Albert E. Smyser of Harwich Port, Mass., died on December 15; Charles G. Howe of Springfield, Ohio, on November 21; and Frank A. Howard of Ridgewood, N.J., on February 6.—JOHN A. ROCKWELL, *Secretary*, 24 Garden Street, Cambridge 38, Mass. FREDERICK W. DAMON, *Assistant Secretary*, 275 Broadway, Arlington 74, Mass.

• 1899 •

Joseph L. Hern of 34 Adams Street, Dorchester, Mass., graduated with our Class in Electrical Engineering and then, being a glutton for work, took a degree in Mechanical Engineering in 1900. Then, successively, he was draftsman for the American Pneumatic Service Company; engineer with the Mutual District Messenger Service; five years working on structural steel design and inspection; eight years as superintendent of heating and ventilation, Department of School

Buildings, Boston, Mass.; heating and ventilating engineer and contractor; J. L. Hern Engineering Company, Boston, for 32 years. Joe is still active as consulting engineer in these specialties. He seems to hold the propagation record with a total of 10 children and four grandchildren. Any classmate who can challenge Joe in making work for the census taker is invited to write to the Class Secretary thereon.

Henry F. Leavitt, I, now retired, is a native of Saco, Maine, and came to the Institute from the Thorton Academy of that municipality. His first year out of Technology was spent surveying and in other work connected with the construction of the Boston Elevated Railroad. The following year, he worked for the Barbour Stockwell Company of Cambridge. For the next six years he was in underground conduit construction work in Boston, and one year with the Fall River Electric Company. Then for 40 years Henry was superintendent and later general superintendent in New Haven and Bridgeport for the New Haven division of the United Illuminating Company of New Haven for cable installations and underground conduit construction work. Henry has one son and is now living at 6 Alden Avenue, New Haven 15, Conn.—BURT R. RICKARDS, *Secretary*, 381 State Street, Albany, N.Y. MILES S. RICHMOND, *Assistant Secretary*, 201 Devonshire Street, Boston, Mass.

• 1900 •

Fiftieth Anniversary Reunion, June 8 to 12, 1950. Although only 10 days have elapsed at the time of writing these notes since the letter was mailed to the Class asking for the registration of those who anticipate coming to the reunion, 35 members of the Class have already signified their intention of coming. These are: Atwood, Z. M. Briggs, Brown, Cayvan, Chalmers, Clarke, Crowell, Everett, Fitch, Grant, Hart, Hughes, Jackson, Joutett, Kattelle, Lawley, G. H. Leach, R. H. Leach, Leary, Madero, Manley, Moody, Morris, Newhall, Oxnard, Price, C. A. Richardson, Ripley, G. E. Russell, Silverman, C. E. Smith, Standish, Ziegler and the Secretary. If all of these come with the guests they have indicated, we will have an attendance of 80 persons. We expect that many others will report favorably later on.

We wish that many of those who are coming would write personal letters to men whom they would like to see, urging them to come. Personal letters are often most effective in inducing favorable decisions. The Secretary will gladly supply addresses if desired. Note that Salvador Madero is coming all the way from Mexico to the reunion. Doesn't that encourage others to come from a distance? We ought to have some of our numerous California residents with us.

The Midwinter Meeting of the Alumni, held on Saturday, February 4, was attended by 10 of our Class: Fitch, Jackson, Lawley, Leary, Newhall, Richardson, Russell, Silverman, Ziegler and the Secretary. Every one of these signified his intention to attend the reunion at The

Pines at Cotuit.—Charlie Smith and Elsie left on February 13 for a motor trip through Florida. They expect to return late in March. Jane Bartlett reports that she fears that she will be unable to attend the reunion on account of poor health. Our sympathy to her and our hope that she will improve in health and be able to attend after all. We have received notice of a change of address for George Archibald from Montreal to West Palm Beach, Fla., and for John M. Higgins from Brookline, Mass., to Amherst, N.H.

If anyone has any suggestions for events that he would like to have included in our reunion program, please send them at once to the Secretary and they will be considered by the committee.—ELBERT G. ALLEN, *Secretary*, 54 Bonad Road, West Newton 65, Mass.

• 1901 •

We will begin our news this month with a letter from Bob Derby who writes in part: "I have recently become chairman of the Williamstown Dutch Elm Disease Control Committee appointed by the local board of selectmen. Our campaign is based on doing everything we can locally to control the disease, depending as little as possible on national, state and county help, although welcoming it. The so-called 'Williamstown Plan' has been adopted elsewhere. I spoke by invitation before the New England Conference last November in Boston. I am strongly of the opinion that the disease can be controlled if not eliminated by good work in the various local communities. The only other thing which might be of possible interest is the more or less moot question brought up by Bob Williams of whether or not wives should be invited to the 50th reunion. Like our late secretary, Allan Rowe, I am 'agin' it. Reunion means 'act of reuniting.' As you know, there was not very much general social life at the Institute in our day and one knew comparatively few of one's classmates well. It is not too easy to shake the crowd together at a reunion and I, for one, believe it would be more difficult if ladies, most of whom do not know each other or the men, were present."

A letter from Joe Evans to Mrs. Peterson stated that he fell on an icy driveway in November and broke his arm but was getting on satisfactorily at the time of writing (December). W. Fred Davidson's address is now Saratoga, Calif., and George L. Mitchell is now at 1156 Moama Drive, San Diego 7, Calif. Mrs. Peterson has informed us that Charles W. Curtis died on May 31, 1949, in Lowell, Mass.—In one of Mrs. Peterson's letters she quotes from a letter to her from Charles Bittinger as follows: "Speaking of pictures, I have an interior of the distinguished foyer of the Telephone Building which I painted at night. The stately Doric columns under dim light give a mysterious effect. This painting is rather large for an apartment, 26 by 32 inches. However, it is the only picture I have which is related in any way with Guy's activities and I would be delighted to present this picture to you if you would care to have it." Mrs. Peterson writes: "I

certainly appreciate his thoughtful kindness. He is a distinguished artist and has his work in the Metropolitan here and in other noted places. I feel highly honored."

I have a clipping taken from the New York Times describing the 150th anniversary reunion on January 1 of the coming to this country of the Du Ponts. "Mr. du Pont, dean of the family, represents the fifth generation in direct line from the first Pierre who fled from France because of his political beliefs. Among those present, it was learned, were his brothers Lamot and Irénée. All three are retired former presidents and former chairmen of the board of the far flung du Pont industrial empire which has its headquarters in Wilmington, Delaware."

As you learned in the class letter, our classmate Russell Putnam died suddenly on January 16. The funeral was in Waterbury, Conn., on January 19 and, with the help of Ed Davis, we were able to send flowers in the name of the Class. The following is a quotation from a Waterbury newspaper: "J. Russell Putnam, 69, Summit Rd., Prospect, mechanical engineer for the U. S. Time Corp. until his retirement two years ago, died . . . at the home of his son, George C. Putnam, in Westfield, N.J. after a brief illness. Mr. Putnam was born June 30, 1880 in Boston, son of the late George E. B. and Ellen (Whitney) Putnam. He lived in Prospect for 12 years. He was a member of the First Baptist Church and chairman of the board of trustees; a member of Harmony Lodge, AF and AM; Eureka Chapter, Royal Arch Masons; Waterbury Council, Royal Select Masters; Naomi Chapter, Order of Eastern Star; Galilee Shrine of White Shrine of Jerusalem, of which he was past watchman of shepherds; and past master of Prospect Grange. He was a graduate of . . . Technology . . . ; a life member of the University Club; member of the Sons of American Revolution; member of American Society of Mechanical Engineers; member of Library Board in Prospect; member of Nosahogan Lodge of Odd Fellows; member of the National Association of Watch and Clock Collectors; member of the YMCA and a member of the Mattatuck Historical Society. Besides his son he is survived by a daughter, Mrs. Harry R. Lange, Waterbury; a sister, Mrs. Harry G. Chesley, East Sumner, Maine, and six grandchildren."

Ed Davis has sent me the following somewhat more intimate information concerning Russell: "Several years ago Russell had a heart attack which laid him up for some time and his recovery left him with some self-imposed limitations in the matter of physical activity. There was, I understand, another one a while later. Certainly his wife's death, also following an earlier heart attack, had been a great shock to him. He had, indeed, decided upon retirement from his company position in order to be more with her. His new home that they had built in the neighboring town of Prospect — his married daughter now occupies his former home in Waterbury — had given them both great satisfaction, but he was stopped by his physical condition from

doing as much in the garden and on the place as he had planned. He did, though, have a very complete workshop in his basement and there he found a most congenial occupation in his last years in repairing and tinkering with the variety of old time clocks that constituted his principal hobby. These and his happily and successfully married children contributed greatly to the genial and equitable personality which made his social contacts and community services so affectionately appreciated by his associates and neighbors. On his recent visit to his son's home in New Jersey he had contracted a cold and had the attention of a doctor. His recovery was satisfactory and, the day being sunny and warm, he had taken a chair out on the porch to read his paper. The doctor dropped in at the house on a routine call and stepped out on the porch to see him and there discovered that he had died. Apparently, a final heart seizure had come without premonition and without pain. Many years ago he had patiently and courageously endured a protracted and painful lesion in his back. Finally overcoming this, which he had not allowed to invalidate his business competence or his personal serenity, he had formulated a regime of living which seemed to maintain a good balance in his physical being. Nevertheless, the whole affair had undoubtedly been a strain upon his system, as it had been also a challenge to his will and his strong and stable personality, and his friends appreciated and admired the way that he overcame what would have been a far greater handicap to others less strong and resistant. All of this, in sum, was signified in the large and reverent gathering at the church at the time of his funeral, and it was fitting that the affection and esteem of the Class of 1901 should have been betokened there."

A note from Everett Pendleton to Mrs. Peterson reads in part: "I have your letter of the 28th and regret very much to learn of your husband's passing. It is somewhat belated to offer you my sympathy in your bereavement, but you have it, nevertheless. I published my Pendleton genealogy back in 1911. Have two supplements for it ready for the press. In March, I should be mailing out the Holloway genealogy on which I have been working for several years. Keeps me busy now I'm retired. Plans for 1951 class reunion sound interesting." — I was very glad to receive a letter from Ed Fleming with whom I went to grade and high schools in Cambridge. He writes: "I was very sorry to hear of Peterson's death and note that you have taken over his duties as class secretary. Since I have had frequent letters from Peterson, wanting to know what I was doing and how I was getting on, I thought you might be interested in the enclosed clipping. It is only a year from now when we will hold our 50th graduation reunion and I am planning to be back in Cambridge at that time." The clipping from the Salt Lake Tribune reads as follows: "Edward P. Fleming, consulting metallurgist, American Smelting and Refining Co., has been retired from active duty after 44 years employment with the firm, R. D. Bradford, gen-

eral manager, announced . . . February 1, 1950.

"Mr. Fleming, appointed consulting metallurgist in 1929, will be retained by the company as a part-time consultant. A resident of Los Angeles the past eight years, he joined A. S. and R. in 1906 as a chemist on completion of the company's Garfield smelter. He was employed in the capacity of chemist and assistant metallurgist during the following five years. In 1911 he was named assistant smelter superintendent at Chile's Braden Copper Co., now a subsidiary of Kennecott Copper Corp. He served three years at that operation. Mr. Fleming returned to Salt Lake City in 1914 and assisted in A. S. and R.'s investigation of smelter smoke conditions. He was in charge of the chemical and metallurgical investigations for three years. He served as a field metallurgist on a traveling assignment through United States and South American properties from 1918 to 1929. After completing this work, he was assigned to the A. S. and R. New York City office and appointed a consulting metallurgist. He also served as a member of the company's advisory board. Mr. Fleming again returned to Salt Lake City in 1933 in present capacity. During recent years, Mr. Fleming has been engaged in research on metallurgy processes. He has assisted in the company's program of developing new processes for treating ores and the development of by-products. The metallurgical official is a native of Scotland, coming to the United States at 7 years of age. His mother was curator for 30 years of astronomical photography at Harvard observatory and was the first woman to become an officer at Harvard. Mr. Fleming is a graduate of . . . Technology, majoring in mining and metallurgy. His first assignment, in 1901, was as assistant mining engineer at the Morenci property of Phelps-Dodge in Arizona. He later was employed at the Phelps-Dodge property at Douglas, Arizona as a chemist."

Willard Dow and I were present at a meeting of the M.I.T. Club of Wellesley the other night. Willard is still very busy as a C.P.A., and says that he has no intention of retiring. He likes his work too well. He is still an active squash player. — Bob Williams, general chairman for our 50th reunion in June, 1951, requests that all those who have not already returned to him the questionnaire sent last February do so at once. The information asked for is needed in order to complete our plans. It is too early to advise you of our program but the necessary committees are being appointed and you will be advised later on. We expect to have a meeting of the committees on Alumni Day in Boston on June 12, 1950. — THEODORE H. TAFT, Secretary, Room 3-282, M.I.T., Cambridge 39, Mass. WILLARD W. DOW Assistant Secretary, 287 Oakland Street, Wellesley Hills 82, Mass.

• 1903 •

Just after we had written our notes for the February issue, we received notice of the death in Melrose, Mass., of Arthur P. Rice, I, who was with us for two years. For many years, in fact, for nearly his whole life, he was employed by the state

of Massachusetts in the Harbor and Land Commission, the Department of Highways, and the Department of Public Works. At the time of his death, he had been retired for about a year from a rating of senior engineer. He leaves his wife and one son. On January 4, Albert W. Kimball, V, died in Newburyport, Mass. He, too, had been with various Massachusetts state departments, practically ever since he graduated. At the time of his death, he was an inspector in the Department of Labor and Industries and had belonged to various civic and fraternal organizations. He is survived by his wife, two sons and two daughters.

Of a more cheerful nature, Hewitt Crosby writes from Fort Lauderdale that he, Tom Sears, Regestein and Lounsbury expected to have a small '03 reunion in Florida this winter. Howard S. Morse, I, sends word of his retirement as executive vice-president of the Indianapolis Water Company. A very fine tribute is paid Morse in the local paper, and commends his life in Indianapolis as "active, purposeful and full of productive results." He began with the Water Company in 1925, after being in Louisville, Cincinnati and Akron. He is active in various civic and church circles and is to remain on the board of directors of the company. We wish him a long and happy retirement.

Two letters from Gib Gleason tell of his new house in New Jersey and of two visits he has had with H. S. Baker, I. Baker has a big beautiful farm lying between the Delaware and Rapidan rivers. He has retired from the active management of the farm, leaving that to his son. He and Gleason had a grand time running over athletic events at the Institute 50 years ago. As a result of their renewing friendship, they suggest that a reunion for men living within 50 miles of New York City be arranged for this year. Sounds good. Baker has a son, a granddaughter, and a great-grandson. — FREDERIC A. EUSTIS, *Secretary*, 131 State Street, Boston 9, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, Box 103, South Wellfleet, Mass.

• 1905 •

Quite a number of replies to questionnaires have been received since last writing, which makes the Secretary's job this month a bit easier. Paul A. Montanus, II, who has been with the Springfield Machine Tool Company, Springfield, Ohio, since 1915, at least, is now president of the company, still active. Paul had seven children, lost one in World War II, has eleven grandchildren (almost the record), is president of the Springfield Conservancy District and a member of the Park Board. Milton Rubel, III, writes that he is "currently disconnected," which we interpret as meaning retired from business. Fred Pirie, II, says "still hanging on, with a little more pressure on the soft pedal." Remember when Fritz used to bang the piano for us at the "Union" up over the shops back in 1903-1904?

William H. Crowell, IV, address 2454 Southwest Sherwood Drive, Portland, Ore., admits retirement. Principal interest is the local Audubon Society, of which he is president. Three children, six grand-

children. Errett M. Graham, I, Shaw Island, Wash., retired long ago from railroad work but is active out-of-doors all the time on his 90-acre place. Has a son and daughter, both unmarried, the former working for Douglas at Santa Maria. Frank E. Drake, II, now vice-president and chief engineer of Pacific Gas Corporation, 404 Washington Avenue, Pelham, N.Y., home address, 630 Fifth Avenue, New York City, calls himself "just a plain gas engineer, building Propane plants throughout the world." Frank's chief interest is in his family. Has one son, two daughters. Son Francis E., Jr., graduated from Columbia in 1937, now an electrical engineer with Rochester (N.Y.) Gas and Electric Company. Junior has two sons, F. E., 3d, and Gurden E. Oldest daughter married a prominent medical doctor in Toronto, has two children. Youngest daughter married an attorney in New York City, has one son.

C. Robert Adams, I, 62 Farragut Avenue, Piedmont, Calif., "semi-retired" for many years, has been a builder of irrigation canals, highways and housing projects, acting as a contractor or entrepreneur. Has one daughter and two grandchildren. Tom Osgood, III, 614 South Hote Street, Los Angeles, "retired." We have a five-page typewritten story of Tom's business life, which will be placed in the archives for anyone to read at a subsequent reunion. From this we learn of many important positions in accident prevention work, principally in California and since 1917, was chief safety engineer for the Metropolitan Water District of Southern California, worked over five years on the construction of the Colorado River Aqueduct. Returned to the east to serve as chief safety engineer of the Pennsylvania Turnpike Commission, construction of 153 miles of four-lane highway between Harrisburg and Pittsburgh, then three years as technical assistant in the storage and handling of explosives at the Kingsbury Ordnance Plant, LaPorte, Ind., returning to Los Angeles in 1942, where he was administrative assistant (for the University of California) in conducting the Federal sponsored "Engineering, Science, Management and War Training Program" in airplane factories, shipyards and other war plants and depots. Tom was a member of the American Society of Civil Engineers, the American Society of Safety Engineers, the National Safety Council and the Masons. — Edwin M. Lines, VI, retired in January, 1948, after many years of service as director of research for Bird and Son. Residence 35 Guild Road, Dedham, Mass. Has two daughters, four grandchildren, has been senior warden and treasurer of St. Paul's (Episcopal) Church, Dedham. Hobby? "I have always wanted to play the piano. That I began after retirement. I find an enormous amount of work brings little results, still I persevere."

Gene Kriegsman, I, senior engineer, United States Department of Commerce, Bureau of Public Roads, residence, 2511 Q Street Northwest, Washington 7, D.C. Doing liaison work, co-ordinating highway transportation with all other modes, rail, water and air. Gene was married five years ago. Expects to be auto-

matically retired in three years and plans to live in Idaho, later build a place in Sun Valley. Gene invites the Secretary to visit him in Idaho or Washington. Hope to do so — also that some class member will accept my proxy. Robert S. Beard, I, 616 East Lincoln Avenue, Mt. Vernon, N.Y., retired fairly recently, says his hobby is recreational mathematics, that he gives talks to high school classes on the subject. He sent samples of some very intricate and beautiful blueprint designs to your Secretary, also models of a honeycomb dodecahedron and a 20-sided solid. They must mean something but it's like "casting pearls before swine." Some day he should give us a class demonstration. Herbert W. Olmsted, who was with us only about a year at M.I.T., writes very interestingly from his place of retirement, Gilmanton, N.H. He was with the Great Atlantic and Pacific Tea Company for 25 years, being director of the Eastern Division Board in charge of operations at the time of his retirement. Has two children, three grandchildren. His son graduated from Dartmouth, is assistant on grounds and buildings. He invites any classmate touring New Hampshire to find him at Gilmanton (near Laconia) and see a real old colonial home with panelled walls of old feather boarding, H hinges, hand whittled catches, and so on.

1905 had one of the best turnouts for the M.I.T. Midwinter Meeting at Walker Memorial on February 4. Present were Marcy, Kenway, Balkam, Ball, Stevenson, Shapira, Killion, Tower, McLean, Buff and your Secretary. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston 10, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 69 Newbury Street, Boston 16, Mass.

• 1907 •

Ernest Farnum Lewis died suddenly in a New York hospital on January 18 as the result of a coronary occlusion. He had been feeling well up to a few hours previous to his death. Duke, as he was familiarly called, graduated from Brown University with the degree of A.B. in 1905 and then came to the Institute, where he graduated with our class in 1907. He was awarded a fellowship in architecture by the American Academy in Rome and during the years 1908 to 1911 studied abroad. During his career he was associated with various architectural firms in Providence, Montreal, and New York, his most recent connection being with Gugler, Kimball and Husted of 101 Park Avenue, New York City. He was a member of the American Institute of Architects. During World War I, he served in the air service and was the commanding officer of the 16th AERO Construction Company in England and in the United States, receiving his discharge in April, 1949, as a lieutenant. He did not marry until 1943, and his wife, Gertrude Wilharm Lewis, survives him. Her address is at the family home, Farnum Farm, Harmony, Rhode Island. — Word has been received from the Alumni Office of the death of Harry C. Arnold, who was associated with our class in the course in chemistry, on September 24, 1947. I have no information as to any of the activities of this classmate since

1907. His most recent address was in Biddeford, Maine.

During January, I received two letters from Willis G. Waldo, who is a consulting engineer working entirely on ramie developments with a permanent mailing address of Post Office Box 1685, West Palm Beach, Fla., although the two letters were written from Columbus, Ga., where he expected to be located until April 1 of this year. As has been noted in our class notes during recent years, Willis has been devoting his energies with great industry and enthusiasm in making improvements in the cultivation and treatment of ramie so that it can be economically and successfully used in various kinds of fabrics. As the result of September hurricanes in each of the two years, 1947 and 1948, the Florida Ramie Products Corporation, of which Willis was vice-president, lost its entire supply of green ramie in the high water. Willis points out as it costs nearly \$100 per acre to buy roots and plant ramie, the loss of 1,200 acres was a major catastrophe. He tells me in his letters of plans he now has under way which he believes will result in a larger ramie development than anything which has previously taken place. Quoting a portion of one of his letters, he states that: "A modern ramie industry, protected from standing water in its fields (fatal to ramie in 48 hours), should demonstrate the definitely-known fact that it can easily operate profitably on its by-products alone, so that the cost of the fiber is a matter of bookkeeping. The Florida picture has been obscured by floods, wartime costs, and the use of undesirable materials of construction due to lack of priorities, but there is being accumulated a fund of know-how which will soon result in successful operations — of that I have no doubt." In the January, 1950, International edition of the *Cotton Trade Journal* published in Memphis, Tenn., is an article written by our classmate describing the value of ramie as an aid to the cotton industry in its efforts to compete with the many modern synthetics. — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. PHILIP B. WALKER, *Assistant Secretary*, 18 Summit Street, Whitinsville, Mass.

• 1909 •

The annual Midwinter Meeting of the Alumni was held at Walker Memorial on February 4. There were six of us "grown-ups" there, Howard Congdon, I, Chet Dawes, VI, Francis Loud, VI, John McCarthy, I, Chick Shaw, V, and Henry Spencer, II. In addition, there were a number of "juniors" present, John Congdon who is now a sophomore in the Hingham High School and plans to be M.I.T. '56, and Francis, son of John McCarthy, who is now taking Course X at the Institute. Howard is with Clifford T. Rhoades of 53 State Street, Boston, structural designers; and John, who lives in Dorchester, teaches mathematics in the Boston English High School. Chick Shaw's son Bradford is now with the Westinghouse Electric Corporation at Readville, Mass., his stepson, Walter Rapp, is maintenance engineer with the National Biscuit Company and has recently been transferred to Los Angeles. Keith Rapp, the younger, is

a second year student at the Tufts Medical School. Both boys were with us at the alumni meeting a year or so ago. Kendall Spencer was at the meeting on his own, sitting with his Class of '43. He is now with his father at the Blanchard Machine Company, Cambridge. Francis Loud suddenly left in the fall for San Juan, Puerto Rico, staying at the Condado Beach Hotel. At first it appeared that he might be taking a winter vacation, but we learned that he was on important business for Jackson and Moreland.

Those who did not attend the Midwinter Meeting missed something. The '09 table was adjacent to the presidential one and both Karl Compton and Jim Killian '26 called us by name and talked to us in that cordial manner which is characteristic of both of them. I don't see how they remember names and faces so well. Both made impressive statements on the present status of the Institute and its future plans. Marshall Dalton '15 told of the enthusiasm of the Alumni everywhere for the Financing Development plan and of the several large contributions recently received, one of \$1,000,000 from the Campbell Soup Company. Then Larry F. Livingston of the E. I. duPont de Nemours and Company gave a lecture with demonstrations on how his company contributes to the prosperity of the country by its development of new materials and products which for the most part are used by other industries, large and small, as bases for useful articles of commerce.

We have received a most interesting clipping from the Atlanta, Ga., *Constitution* showing Charlie Belden, II, in a cowboy sombrero and the headlines are "High Museum Shows Art by Belden." You will all remember that Charlie was undoubtedly the most glamorous "she" who ever took part in a Tech Show. After graduating from the Institute, he decided to see the world and with two companions made a trip across the Russian Steppes. When he returned to the United States, he took up life in Wyoming, where he was brought up, operating a dude ranch which brought renown to him and the state. Recently he has transferred his residence to Redington Beach, St. Petersburg, Fla. During the past six months, he has made a 9,000-mile motor trip through Italy, Austria, Switzerland, and France. In all his pilgrimages from the very beginning, Charlie has not only taken his camera, but has wielded it incessantly and with a discriminating eye. The museum is the High Museum of Art in Atlanta, the show was sponsored by the Dixie Camera Clubs, and I understand that only Charlie's photos were featured. These included a collection which depicts ranch activities and personalities, many of which were taken on Charlie's own ranch. The clipping went on to say "from cows to cuties is the photographic saga of Charles Belden." — From several sources we have received notices that Tom Desmond, I, is continuing his unrelenting war on the billboards. He is introducing four bills in the New York legislature to curb the placing of billboards on the public highways and to give local authorities more power to control and regulate them. For years, as far back as when Herbert Lehman was

governor, attempts, including many by Tom, have been made to pass such laws. However, the billboard lobby has so far been too powerful. We, who know Tom, can, however, accurately predict the ultimate outcome.

Here is a letter to Paul from Sam Main who is in London. It tells its own story. "It was so nice to have your card forwarded over here. I've been here for the last six months playing 'Bernard' in 'Death of A Salesman' with Paul Muni. It has been a wonderful experience and Kazan's direction was exciting. I have enjoyed England so much, and being an old Bostonian feel right at home here. I've been out to the country quite a bit and love it. Unfortunately, I never got to Somerset, the home of my grandfather and grandmother Frost. Hear they make real good cider there. Real potent! Betty arrived for Christmas, so the holidays were happy and full. The show closed on January 28 and we have been using these days of 'freedom' seeing plays, galleries, and so on. We leave for Paris February 9 for about two months. Then home, unless another job comes up here."

Again, with regret, we report the death of another classmate, Edward Taber Almy, Jr., III (special), 63 years old, which occurred on January 4 at his home, 38 Stanford Place, Glen Ridge, N.J. Our records show that he came to the Institute from New Bedford, Mass., and was originally connected with '08. For a time, he was with the American Coal and By-Products, Coke Company, at Chattanooga, Tenn. He worked for several years in the Mexican silver mining industry and about 35 years ago joined the Sinclair Refining Company. After being located in Chicago and Pittsburgh, he came to New York in 1930. He was assistant chief engineer of the company at the time of his death. Surviving are his wife, Mrs. Berenice Almy and a son, John D. Almy. — PAUL M. WISWALL, *Secretary*, Box 125, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries*: MAURICE R. SCHARFF, 285 Madison Avenue, New York, N.Y.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

• 1910 •

In January I made two trips to New York City; one on business and the other to make good a promise I had made to Carroll Benton that I would attend one of the luncheons held monthly by 1910 men in New York City and its environs. On the business trip I stopped in to see Clark Arkell and Cameron Clark. I had very pleasant visits. Clark Arkell promised that he would at least attend the class dinner at the Griswold in June and Cameron Clark said he would attend the entire reunion if I could have the assurance of at least four other Course IV men attending. I am very sure that Cameron will be on hand for the reunion.

The luncheon of New York classmates was held at the Downtown Athletic Club on January 30. It was a very enjoyable affair; good company and excellent food. There were nine classmates present: Harold Arnold, Carroll Benton, Harold Cum-

mings, Karl Fernstrom, Gordon Holbrook, John Lodge, Erford Potter, R. A. D. Preston and Arthur Stein. There was considerable discussion about our 40th reunion but everyone present intends to participate in the gathering at New London, Alumni Day in Boston, or the entire celebration. If any member of the Class is in New York on the first Wednesday of the month, I advise him to call Carroll Benton at the American Telephone and Telegraph Company, 195 Broadway, for a reservation for a most enjoyable time.

At the Midwinter M.I.T. Meeting there were four '10 men attending: Abbott Allen, Art Curtis, George Lunt and myself. All four of us left this meeting agreeing that we would see each other at the Griswold in June. — There will be no 1910 notes in the May or June issues of *The Review* unless I can find someone to pinch hit for me. On March 7 I am sailing for the Mediterranean on the American Export Lines S. S. *Excalibur*, to Egypt, Greece, leaving the ship in Italy, then up through France, to England, and home May 15. I ought to be in prime condition for the reunion, where I expect to see at least one hundred '10 men. — HERBERT S. CLEVERDON, *Secretary*, 120 Tremont Street, Boston 8, Mass.

• 1911 •

Believe it or not, there were eleven '11 men at the annual Midwinter Meeting of the Alumni Association at Walker Memorial the evening of February 4! Best of all, though, was the fact that one of the "lost sheep" appeared; Nate Levy, I, who said he was ashamed to say he hadn't attended an M.I.T. function since 1916, when the Institute moved across the Charles. He has been for years, and still is, with the sewerage division of the Metropolitan District Commission with his office at 20 Somerset Street, Boston 8.

In the absence of Alumni President C. Adrian Sawyer, Jr., '02, I presided at the affair and what a thrill it was to introduce Karl T. Compton, who had only that week returned to his desk as chairman of the board. He was given a thunderous ovation — in fact it started before I was able to complete a short introduction, mere mention of the magic name, Compton, doing the trick. An account of the whole affair appeared in last month's *Review* in the main news section, so suffice it to say here that in addition to Levy and me, the following classmates sat in: Obie Clark, II; George Cumings, VI; Henry Dolliver, I; Bill Fortune, I; Jack Herlihy, II; Charlie McManus, I; O. W. Stewart, I; Emmons Whitcomb, X; and Aleck Yereance, I.

Subsequent to an earlier announcement in the class notes that Bill Orchard, XI, general manager of Wallace and Tiernan, Newark, N.J., had been awarded the 1949 Charles Alvin Emerson medal for meritorious service to the Federation of Sewage Works Associations at that group's convention in Boston last fall, I have now received from Rolf Eliassen, Professor of Sanitary Engineering at the Institute, the notes that the association president used in making the award. The citation read: "For his faithful and devoted service to the Federation from its very inception,

through a period of over 21 years, to the present time. His guidance in major policies, and particularly in financial matters, has been a prime factor in the progress of the Federation to its present strong position. Mr. Orchard has been a member of the Board of Control for 20 years and chairman of its finance committee throughout this entire period. He has been chairman of the convention management committee for 4 years, a member of the meeting place committee for eight years and a member of the executive committee on three occasions for a total of 11 years." Then followed a biographical summary, relating his start as assistant sanitary engineer with the Metropolitan Water Board in Boston; in 1912, assistant engineer in the control of water works and sewage treatment plants of the New Jersey State Department of Health; in 1915 started with the then small organization of Wallace and Tiernan and today is at the top there. Memberships include being an honorary member of the federation which honored him and of the American Water Works Association; past president of the Water and Sewage Works Manufacturers Association; a fellow of the American Public Health Association; a charter member of the New Jersey Sewage Works Association and a long-time member of the New York State Sewage Works Association. In conclusion, the president said: "His entire career has been characterized by noteworthy labors for the public good: Community Chest leader; present service as chairman of the board of the Orange Memorial Hospital and service for several years as president of the Chamber of Commerce of the Oranges and Maplewood. The esteem in which he is held by his fellow citizens is best attested by the fact that two years ago he was acclaimed by this joint Chamber of Commerce as being the 'outstanding citizen of the Oranges and Maplewood.' William Orchard, it is with sincere pleasure that I am privileged to present you with this plaque, in recognition of your long record of distinguished service to the Federation." Congratulations, Bill; we all are proud of you!

Ten scholarships of \$300 each at Northeastern University were recently given by the Associated Industries of Massachusetts to enable sons and/or daughters of workers in Massachusetts' industries to complete their education in the industrial field. In accepting the gift in behalf of the University, President Carl Ell, XI, commended the close co-operation that for years has existed between the A.I.M. and N.U. and praised this "clear evidence of the will of the men who own and manage the chief industries in the Commonwealth to help the children of employees who want to help themselves. Our co-operative plan of education," continued Carl, "whereby 3,000 N. U. students are presently employed with 550 firms, most of them A.I.M. members, appeals to young people who believe themselves capable, who want to succeed, who are willing to work and who seek only an opportunity to prove themselves. It does not attract those desiring economic preference or advancement over a road free of difficulties and hard work. Therefore Northeastern is a natural educational

channel through which the Associated Industries of Massachusetts can assist the children of their employees in realizing educational objectives. You are, through this grant, making possible a college education for many young people for whom higher training would otherwise be impossible."

Trust the irrepressible Monk deFlorez, II, now a member of the M.I.T. Corporation, to capitalize on current events to get a laugh! At the Midwinter Meeting, President Killian told us that in late January he received a telegram from deFlorez: "Congratulations on the capital funds donation from Brink's! Who solicited it?" — At the January furniture markets in Chicago and New York, the F. A. Whitney Carriage Company, Leominster, Mass., featured a complete new line of baby carriages and strollers. This was the opening gun of an extensive Whitney sales-expansion program, based on specialized design for maximum consumer satisfaction by Harold F. Shaw, II, for many years chief designer of the Whitney organization. I also learn that Harold has recently been elected and is now serving as president of the Rotary Club of Leominster. Maybe we'll get him to a class reunion yet!

Had a nice letter from Walter Welch, VI, whom I had seen at the "Dennie luncheon" in New York on January 12, written from Miami, whither he went for a fortnight shortly thereafter. He said he looked up an old M.I.T. friend, H. C. Dunbar '12, and found he was busy and doing nicely since moving to Miami a year ago. Walter, a former president of the Kiwanis Club of Rye, N.Y., added that he hopes to return to Miami in May for a Kiwanis convention. — Bill Coburn, XI, spoke on "Investments" at a Cambridge meeting of the Boston section, American Institute of Mining and Metallurgical Engineers on February 6. — Charlie Edwards, XIII, for many years with Pan American Airways in Manhattan, is now with Bellinger Davis Company Travel Service at 77 East 56th Street, New York City. He still lives in Douglaston, L.I. — Aleck Yereance, I, met Fred Harrington, I, on the street in late January and Fred says he is feeling quite well after a recent serious illness, although he is quite tired each night now that he is back on his job full time with Whitman and Howard, Inc., engineers, Boston. — Morris Oman-sky, V, lectured to the rubber group of the Northeastern section of the American Chemical Society on "The Technology of (Rubber) Mill and Banbury Mixing" at the group's meeting at M.I.T. on February 16.

At the turn of the year, here is how classmates are located, for the 352 for whom we now have good addresses: Boston and vicinity, 86; balance of Massachusetts, 32; New England, outside Massachusetts, 30; all New England, 148 or 42 per cent. Metropolitan New York, 54; balance of New York and New Jersey, 18; total New York and New Jersey, 72 or 20½ per cent. Balance of Atlantic states, 43; middle west, 38; southwest and west, 30; United States outside northeast, 111 or 30½ per cent. Territories and foreign, 21 or 7 per cent. Of the 352 on the 1911 mailing list, 233 or 66 per cent are gradu-

ates or associate members of the Alumni Association.

Stanley E. Bates, I, is now at 10,000 South Ridgeland Avenue, Oak Lawn, Ill.; J. Burleigh Cheney, Post Office Box 255, Providence 1, R.I.; and Edward C. Tolman, XIV, 1530 LaLoma Avenue, Berkeley 8, Calif. See you Alumni Day at M.I.T., Monday, June 12! — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

• 1912 •

Dick Stickney, III, recently wrote from his home at 51 Elm Street, Stoneham 80, Mass.: "Having settled in Stoneham after being retired from the Army, I have this fall watched some football games at Wentworth Institute where my son is a freshman taking the Airplane Mechanical Engineering Course. It being just four decades since I subbed on the Tech Sophs, it was interesting to watch M.I.T. '53 beat the J.V. there 12-6 on October 20 and M.I.T. '52 beat the same team 26-0 on October 13."

The Clarence K. Reimans, X, of Newton recently announced the engagement of their daughter, Joanne, to John Dykstra Eusden. The marriage will take place in June. Joanne was graduated from Wellesley in 1946 and is now studying for her master's degree at the Boston University Graduate School of Social Work. John is the son of the Reverend and Mrs. Ray Anderson Eusden, also of Newton. He is a graduate of Harvard University with the class of 1944 and attended the Harvard Law School. He was graduated from the Yale Divinity School in 1939 and at present is studying for his Ph. D. degree at the Yale Graduate School. During the War, he served as a pilot in the Marine Corps. Congratulations to the young couple!

The Lester Whites, on a trip to Washington in December, had a very fine dinner and spent a very pleasant evening with Aksel and Helen Pedersen. Aksel showed some of his splendid movies of the Far East. He also promised to write some notes for The Review. I am still hoping. — FREDERICK J. SHEPARD, JR., *Secretary*, 31 Chestnut Street, Boston, Mass. LESTER M. WHITE, *Assistant Secretary*, 4520 Lewiston Road, Niagara Falls, N.Y.

• 1913 •

George Starr, I, died, in London, England, from a heart attack on New Year's morning, 1950. He had been in Birmingham to assist Preload, Ltd., (Great Britain) in starting their operations on the lining of steam pipe. George was associated with John Hession's, I, Preload Corporation of Boston which concern had perfected the application of this lining. George was in London on December 19, ready to fly home, when he had the attack. Mrs. Starr and their son flew to England to arrange for burial services which were held in Darien, Conn., on January 7. George was a very likable man, and it has been my good luck to run into him several times over the years. He was a capable engineer, and his work required him to do a great deal of traveling. He had charge

of light construction jobs, involving pioneer engineering applications, in which his level head and friendly manner must have been a big help. Right after I heard the news from George's brother, I talked with John Hession, I, who has always been modest about his considerable accomplishments, and was rewarded with the following: "Referring to our telephone conversation yesterday in which you indicated interest in the operations of the Preload Corporation and Preload Enterprises, Inc., the first being an operating company and the second the patent holding and designing company we have for producing prestressed concrete, there has been a great deal of interest in the United States especially lately on the whole subject of prestressed concrete. Since 1934 or 1935 we have been building prestressed concrete tanks in this country and elsewhere and are still doing this as our main activity. In the last few years we went into prestressed concrete pipe and some articles have appeared on this covering operations in Montreal and in Chicago, but the big thing that put prestressed concrete before the public eye was a bridge for which we are building the prestressed girders in Philadelphia, called the Walnut Lane Bridge. A test girder full size had to be built to satisfy the city as to its strength. The girder was required to carry twice the live load plus the dead, which it did easily, and loadings were continued up to nearly 11 times the live load, yet the girder still had not broken, though it was bent about two feet. It took further loadings to finally break it. The break occurred in the concrete and it made a report like a big gun.

There is no use, however, in having me write a long winded letter about it. Enough publicity on it exists now for anyone interested to find out readily what happened. One of the most complete articles appeared in *Concrete* magazine for December, 1949, both as to reading matter and pictures. I am enclosing a copy of this from which you will see the girder under test with the crowd around it. The reason for all this interest and publicity and for the several hundred engineers standing in the rain all day for seven or eight hours watching the test, is due to the fact the prestressed concrete is much more economical than conventional, or ordinarily designed concrete. On the Philadelphia bridge the saving was some 30 per cent, and that is too much for any engineer to wink at, so they all want to know all they can about the why's and wherefore's. For the last 15 years or so we pioneered in the construction of prestressed concrete tanks and had to learn it pretty much by ourselves, likewise prestressed concrete pipe, but when it came to the bridge field we tied up with Europeans and got the benefit of their knowledge, patents and information. There is still some pioneering to do here, probably a lot of it, including, I must add unhappily, the attendant expense for learning how. I am pleased to say that M.I.T. is on the ball here, as Course XVII (Building Engineering and Construction) carries in its curriculum studies in prestressed concrete. Few if any other colleges have, so far as I know, anything on prestressed

concrete, but it won't be long now. Walter Voss '32, who heads that course at M.I.T., is on his toes, and has known for ten years that prestressed concrete was on the way in. Guess I'd better stop here as I am afraid I'll tire you listening to me on Preload concrete, which is what prestressed concrete really is." I have read two articles about this test, which attracted some 600 engineers. The girder and the test were made at the site of the proposed bridge. Girder span was 160 feet and depth 6.5 feet. Prestressing steel wires were disposed in four cables each built up of 64 wires about 0.276 of an inch in diameter. Cables were stretched some 9 inches to induce the required stress of 140,000 pounds per square inch. One of the important virtues of prestressed design is that since, under maximum load on the girder, the concrete which comes under tension is not overstressed, it thereby can contribute its due share of load carrying. This feature affords a considerable reduction in the weight of steel under that required in conventional "reinforced concrete" design. Back of this successful test must have been long, hard work, heartaches and perseverance. Looking back on John Hession the engineering student, it is plain to see that he had all of what it takes. Between preparatory school and M.I.T., John worked as a stenographer in Washington, D.C. At Technology he was older than average age, a good student, and a regular guy. He had to watch the pennies, but in spite of that, went on for a fifth year to get his master's degree in concrete design in 1914.

Bill Mattson, I, was re-elected last November for his third term as alderman-at-large in Newton, Mass. My congratulations brought the following: "Your telephone call this morning made me realize that it has been a long time since I have seen you or sent you any news. It came as a great surprise that The Review Office happened to send you a news clipping about some of my activities in Newton. I have never considered that any of my doings could be considered as "news," especially along spectacular lines. Time is passing so rapidly — perhaps a sign of approaching old age — that it hardly seems possible it was 15 years ago I became vice-president of the American Locker Company. In those days we were a small struggling outfit operating at a loss; but today we are a successful, moderately sized outfit whose products are found throughout the United States. You will find our parcel checking lockers in every railroad and bus station and we are now developing this service in department stores, theaters, and airports; in fact, wherever the public wants to store their luggage or bundles. Over 40,000,000 persons a year drop their dimes in our lockers and we now do more business in one month than we did during an entire year when I came with the company. No, don't think that I have been responsible for this, but it has been very interesting to see the organization develop over this time. Working for the American Locker Company is my only vocation. My avocations have been confined largely to trying to be of service to my community. Over the years, as you know, Mabel and I have

been more or less 'Civic Nuts.' I have done all manner of things along these lines for the city of Newton, and for the past eight years have been rather actively tied up with the political work of our city, which has grown rapidly and now has a population of 85,000. Enclosed is one of my campaign cards used in the election last month that gives you a brief outline of this civic work. In each of my three elections I have received a very substantial vote and have easily defeated such opponents as have tried to get my unpaid job as an alderman of Newton. The work with the American Locker Company and all these outside activities keep me very busy and perhaps that is one reason why I do not feel so old as perhaps I should. Possibly, if I had devoted more time and energy along business or financial lines, I might have more money in the bank today than I have, but at least I have had a great deal of fun over the years and my friends tell me they appreciate what I have done for them in protecting their interests in the Newton city government. This brings no financial returns but does produce a certain amount of satisfaction that is some compensation for the many hours I spend in this extra-curricular work. Once in a while news comes to me from some of our classmates around Boston. Charlie Thompson and his wife go to the same church we do and last Sunday he told me that he and Hester are taking a three months' trip to California this winter. Charlie is now at that stage in his career where he can take three months from business, whereas I would hesitate to take more than three days from the job. Once in a long while we talk with Bill Ready; and despite only mediocre health, he is still full of his usual pep. Eddie Hurst lives in my neighborhood and we occasionally see each other when we go shopping in Newtonville Square. The family is well and Mabel has completely recovered from an illness she had last summer. She, too, is actively interested in politics; is vice-chairman of the Newton City Republican Committee and is on the governing board of the Boston Women's Republican Club of Massachusetts. Even our daughter, Janet, has the bug and was a very successful treasurer in raising the necessary campaign funds to have her father and two other candidates from my ward elected this year. Since she graduated from Mt. Holyoke College several years ago, she has been with United Investment Service, which is part of the United Business Service in Boston."

Bob Bonney, X, was elected to the board of directors of the American Society of Testing Materials for a three-year term. A recent A.S.T.M. bulletin contained the following: "Following his studies in the public schools of Wakefield, Mass. where he was born, Mr. Bonney attended . . . Technology, receiving his B.S. degree in Chemical Engineering in 1913. For two years he did graduate work and was instructor in Analytical Chemistry. Then followed three years as Chemist with Bird and Son, East Walpole, Mass. Since 1918 Mr. Bonney has been with his present company. For many years he was Chief Chemist in Philadelphia, later, beginning in 1928 he was Director of Re-

search at Kearny. He has been Assistant Manager of Manufacturing since 1934. In A.S.T.M. Mr. Bonney has rendered notable service on the Administrative Committee on Standards, of which he is at present Chairman. His other technical work has been concentrated especially in Committee D-1 on Paint, Varnish, Lacquer and Related Products, in Committee D-8 on Bituminous Waterproofing and Roofing Materials, and in Committee D-6 on Paper and Paper Products. A Past President of both the Philadelphia and New York Paint and Varnish Production Clubs, he is a Council Member of the National Federation. His other professional affiliations include the American Chemical Society, National Farm Chemurgic Council and the American Institute of Chemists. Mr. Bonney's hobby is farming. He maintains a farm in Maryland and is a leading breeder of Aberdeen Angus cattle."

Larry Hart sent me this recent letter from Lammie Lemaire, III: "Your letter of January 31 accompanied by Fred Murdock's of January 26, eventually reached me and brought tears to my eyes, but I could not think of a solution to the problem until I remembered a small balance to my credit in New York. You are probably aware that any Australians possessing moneys in the United States must arrange for their immediate transfer, so I am actually taking a risk in asking some friends of mine in New York to send you along a cheque. The amount will be \$25 and as I cannot remit from this end owing to regulations it had better be extended to last as long as possible. Would you kindly let Fred Murdock have \$5 towards class dues and get me credited for the next four years for Alumni Association dues with the balance. I am still in touch with the Institute as an honorary secretary and only a few days ago interviewed a prospective student and sent the usual confidential screed to Professor Thresher. My greetings to all '13 men, long may they prosper. Please ask the Alumni Association to address bulletins to: Brigadier L. H. Lemaire, Navy, Army and Air Force Club of Victoria, 7 Alfred Place, Melbourne, Australia."

Harold Crawford, IV, sent sad news contained in a Portland, Ore., newspaper clipping: "George H. Jones, 62, 829 N. E. Imperial Avenue, Portland architect, died of a heart attack in his Concord building office . . . (January 23). His architectural firm, Jones & Marsh, recently completed the new Gill coliseum at Oregon State College and was engaged in work on the new Portland fire station. Mr. Jones was born in Portland May 24, 1887, the son of Mr. & Mrs. Thomas J. Jones. His father was an early day Portland architect. Mr. Jones studied engineering and architecture at Oregon State college from 1907 to 1909 and was graduated from . . . Technology in 1913. In World War I he served as a lieutenant with American expeditionary forces in France, returning to civilian life to work several years for the architectural firm of York & Sawyer in New York. He returned to Portland in 1920 and for the following 12 years served as architect for school district No. 1, a period during which he handled construction of

20 to 25 Portland schools. In 1931 Mr. Jones established his own office with Harold D. Marsh, and continued in private practice until his death. He was a member of Delta Upsilon fraternity, a Scottish rite Mason and a member of the Shrine, and was ex-president of the Oregon chapter, American Institute of Architects. Surviving are his widow, Mrs. Maude A. Jones; and one son, Robert W. Lucas, and two grandchildren." Harold wrote that "George Jones was treasurer of the Oregon State Board of Architects Examiners and one of the best architects in the state." Marsh was also in Course IV with our Class. — FREDERICK D. MURDOCK, *Secretary*, Box 788, Pawtucket, R.I.

• 1914 •

The annual Midwinter Meeting of the Boston Alumni was held at Walker Memorial on February 4, with a very sizable attendance. H. S. Wilkins, Crocker and your Secretary represented '14, and we were joined by Dean Fales, who drove down from Kennebunkport, Maine, for the occasion. Because of the small number from our Class attending, no preprandial meeting was scheduled. A very enjoyable evening, however, was spent together.

It is greatly regretted that again the principal portion of these notes has to be devoted to recording the death during the last two months of three of our classmates; namely, John P. Newbury, Jr., Gordon U. Stewart, and Ernest W. Wescott. The two former attended Technology during all four years and were graduated with us. Wescott, however, only took special work with '14, but it became his identifying class.

Stewart died on December 8. He had retired about a year ago from the Philadelphia Electric Company, with which organization he had spent practically all the time since graduation. On retirement he was assistant to the vice-president in charge of finance and accounts and for many years had been engaged in the financial affairs of the company. Stewart prepared for the Institute at the English High School in Boston, and took the Electrical Engineering Course at M.I.T. During his freshman and sophomore years he was on the class basketball team. He took considerable interest in the work of the Electrical Engineering Society. He died at Deland, Fla., where he had taken up residence after his retirement. His wife, the former Elsie B. Payne, survives. There were no children.

John Newbury first attended Mechanics Arts High School in Boston and later finished his preparation for the Institute at the Chauncy Hall School. He was a member of the Chemical Engineering Course and his activities at Technology were in the Chemical Society. Newbury was associated for many years with the Eastman Gelatine Company of Peabody, Mass., which is a subsidiary of the Eastman Kodak Company. In recent years, his position was that of president and general manager. The principal business of his company was making purified photographic gelatine used in the manufacture of film emulsions. He was a director of the Warren National Bank and a trustee of the Warren Five Cents Savings Bank in

Peabody. He is survived by his wife, the former Mary MacGrath. There were no children.

Although Wescott did not take any great interest in '14 affairs, he was well known to many in the Class. He was a member of the firm of Kalmus, Comstock and Wescott, whose early work in color photography developed into the Technicolor process. In recent years, he was a member of the reorganized firm of Comstock and Wescott and was located at Niagara Falls, N.Y. During the War, he was a consultant and technical adviser to General Groves on the Manhattan project. Wescott prepared at Phillips Exeter Academy and attended Harvard University, later receiving his doctorate from the Institute. He is survived by his wife, the former Florence B. Hammond of Buffalo, and by two daughters. — H. B. RICHMOND *Secretary*, 275 Massachusetts Avenue, Cambridge 39, Mass. ROSS H. DICKSON, *Assistant Secretary*, 126 Morristown Road, Elizabeth 3, N.J.

• 1915 •

"To do good and distribute forget not . . .," so pay your class dues. M.I.T. is very much in the limelight these days and our 35th reunion to be held at Coonameset Ranch, Cape Cod, June 9-June 11 is the brightest light of all. Already, 75 men are planning to come and bring many lady guests to the Monday afternoon cocktail party. It is going to be our biggest and best reunion. Plan to be one of the old gang that will be there — visit M.I.T. on Alumni Day, Monday, after we return to Boston from the Cape. Perhaps by now you've heard from your Geographical Section Committee. Then, on March 17 at a Boston class dinner, the details, costs, and so forth will be announced and an official sign-up will go out to all members of our Class. There will be valuable and attractive gifts for all classmates and ladies attending. Good Tom Huff stirred up the boys in Chicago: "When in Chicago in January, I talked to all of the boys on your Chicago list, with the exception of one or two that I arranged to have contacted by other men on the list, due to the fact that they were out of town. I have asked each one of them to write to you and give you some information as to their activities and did my best to persuade them to come to the reunion in June."

An aftermath of Herb Anderson's recent trip to the Orient is a write-up in the Bombay, *India Textile Journal* of October, 1949: "Mr. H. W. Anderson, Executive Vice-President and Director of H. Brinton Company of Philadelphia, U.S.A., is making his first visit to India and is expected to arrive in Bombay by air on the 12th of November. Mr. Anderson's visit will be of particular interest to the knitting industry as it will give the trade an opportunity of obtaining firsthand information regarding the methods of production and new developments of machinery and processing which have been introduced in the U.S.A. It is hoped that his wide appreciation of industrial conditions throughout the world and his intimate machine and process knowledge will be of value to knitwear manufacturers in India." Nice going,

Herb. We certainly were impressed by your colorful cards and interesting letter.

George Simons, XI, makes up for his absence and silence in our class notes with big news in the Jacksonville *Times Union* of December 14 with a dignified picture. I never thought a Course XI character could reach such exalted heights: "Appointment of George W. Simons, Jr., widely known civic leader and municipal planning consultant, as general chairman of the 1950 Baptist Memorial Hospital campaign, was announced last night by the Rev. John S. Rasco, president of the Baptist Hospital Corporation. Simons, former president of Civilian International and one-time president of the local Civitan Club, has been a municipal planning consultant for the past two decades. He came to Jacksonville in June, 1916, and founded the engineering section of the Florida State Board of Health, serving in the capacity of chief engineer from 1916 to 1925. Simons has operated for many years as official consultant for many municipalities, including Jacksonville, Tampa, Fort Lauderdale, Pensacola, Mobile, Ala.; Columbus, Ga.; Chattanooga, Tenn.; Rock Hill, S.C.; and Wilmington, N.C. A member of the Jacksonville City Planning Commission and vice president of the Board of Trustees of the Jacksonville Public Library, he also served five terms as president of Civic Music. His professional affiliations include membership in the American Public Works Association, the American Institute of Planners, the Institute of Traffic Engineers, president of the Florida Engineering Society and founder and former president of the Florida Anti-Mosquito Association. The new general chairman of the hospital campaign is married, has one daughter, Christian J. Simons, and resides at 1452 Avondale Avenue. He is an officer of the Riverside Presbyterian Church where he teaches the Men's Bible class." Congratulations to George.

The appeal of M.I.T. activities has awakened another long silent classmate. Ben Lapp, X, comes to life from Buffalo and what he says only bears out in proof what we've always known about the fine old friendship in 1915. Well, you've all read of my summer visits with the Hiltons and the Neals and some of their doings on their Boston visits to us. Ben writes: "I attended an alumni dinner at the Statler for the M.I.T. Development program and had a swell time. Mrs. Lapp (Sophie) and I went, of course, and we met the Hiltons, Jim Neal and others that I recalled. We really had a grand time and we enjoyed it a great deal. I even knew one of the speakers at the head table, having worked with him once. Horace Ford delivered a nice talk. I received a letter from Marshall Dalton '15 in response to my contribution. The Hiltons are grand and Jim Neal is perfect. Our son, Marshall, is busy applying to M.I.T. for entrance this September. He has maintained a 97 or 97½ average throughout high school." It will be a pleasure to welcome young Marshall Lapp as another 1915 son at M.I.T.

See you at our reunion — meantime — pay your class dues to "help Azel." — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.

• 1916 •

A card from Walter D. Binger announces that he has withdrawn as vice-president of City Investing Company but will continue his association with them as consulting engineer. He has become associated with Frederic R. Harris, Inc., consulting engineers of New York and San Francisco. We certainly hope that Walter will be happy in this new association and we congratulate Frederic R. Harris, Inc., for procuring Walter's services. We thought you might be interested to know that Horace Bickford, whom we mentioned last month, has a son, Horace Jr., who is a licensed professional engineer in the state of New Jersey. He graduated from the Newark College of Engineering and obtained his master's degree from Stevens Institute of Technology. Horace, Jr., is married and lives in Newark, N.J.

It might be well to mention again for the '16 men in the Greater Boston area that on the second Tuesday in each month we hold a regular luncheon meeting at 12:30 P.M. at Thompson's Spa on Washington Street, Boston. We have a table to ourselves and have enjoyable meetings. Don't forget the luncheon day and try to plan your affairs so you can attend even though you may be busy and live out of town. We feel it will be well worth your while. Vertrees Young sent a note saying he will try to get a letter off to us before the winter is over (we are writing these notes in February) with news for the column. He reads the class news with much interest and says he is behindhand in sending in a contribution. Does anyone else plead guilty to the last statement? If so, how about a promise to write to us? We'll remind you of your resolution!

Melville Rood received a citation to commemorate the completion of 25 years with Arthur D. Little, Inc., as a tribute to his long and faithful service. It was a wonderful tribute to a wonderful classmate and Mel surely must be proud of it. He wrote a long letter and he really had tough luck this past year because of sickness and accidents in his family. We certainly hope that 1950 will be so much the other way, that the nightmares of 1949 will be forgotten. He had planned to go to the February M.I.T. Meeting but couldn't make it. Says he always tries to get to our regular Tuesday luncheon, but usually something at the office prevents. We will keep on hoping that he will make it soon for it's nice to chat with him and all the rest who are able to attend.

Professor H. J. Gilkey, Head of the Department of Theoretical and Applied Mechanics at Iowa State College has written a foreword to the recently published *Engineering Mechanics*. Herb points out that there are three kinds of courses in engineering mechanics, the "philosophical" type of engineering course, the "applied" mechanics, and "the more strictly applied" where the "major emphasis is placed on the free body diagram, with an effort at having the student visualize each step of the analysis and problem solving." Herb should know whereof he speaks,

and we venture to say that engineering students at Iowa State are fortunate, indeed, to have him as their instructor. No, Herb, we aren't looking for any bouquets. We really mean it.

Herb Gfroerer, that man who is, we believe, destined to make *Who's Who*, if he hasn't already, presented "Winnie" Churchill with a specially built Sound-scriber machine. In the January, 1950, *Fortune* we read: "Discovering that Soundscriber Chairman Herbert Gfroerer, who presented him with a specially built machine, habitually arises at six forty-five and works straight through from eight to five-thirty daily, Churchill lectured him on how to live a fuller executive life. Said he: 'You must hire a deputy and make him be at your desk at eight. He acts for you while you stay in bed and work from there. Have a secretary come to your home and bring the mail, and be in touch with your office by telephone. Let it be known that your office arrival time is eleven-thirty. You must sleep sometime between lunch and dinner — and no halfway measures. Take off your clothes and get into bed. Don't think you will be doing less work. You will be able to do more. You get two days in one or at least one and a half. When the war started, I had to sleep during the day out of necessity — so that I could work far into the night. But a man should sleep during the day also to be at his best in the evening, when he joins his wife and friends at dinner. A good meal, with good wines, then some of this stuff (here Churchill cupped his brandy glass) that is the great moment of the day.' " We thought you would enjoy reading this little sidelight on the great Churchill, although perhaps some of you saw it in *Fortune*. While we are on the subject of Herb, the machine Winston Churchill used to record his memoirs was presented by Herb to Dr. Vernon D. Tate, M.I.T. Director of Libraries. As you know, it was on this machine that the wartime British prime minister recorded a now famous sentence thanking the staff of Sound-scriber Corporation for providing him with the machine. The message ended: "This is me, Winston Churchill, speaking to you and I am so glad to be able to thank you in this remarkable way." Churchill's use of "me" instead of "I" in violation of the rules of grammar was hailed by some authorities as a "wholesome" trend in the language. So says a recent newspaper clipping.

Vannevar Bush has been elected a director of Merck and Company, Rahway, N.J. Dr. Bush is president of the Carnegie Institution of Washington, D.C., and a director of the American Telephone and Telegraph Company. In connection with Van, we noted in a recent issue of the *New York Times* that Etta Kappa Nu, the electrical engineering honorary society, inducted him into its membership. The paper states he is a "famous electrical engineer. . . ." They can say that again! Just another clever grad of the Class of '16 and a credit to old M.I.T. So we can stick out our chests again and crow a little.

It is our sad duty to report that John Farrar, whom we mentioned last month

as being ill, died in Lakewood, Ohio, on February 4. He was buried in Abington, Mass. Our deepest sympathy is extended to his family. A devoted father, husband and brother, he will be greatly missed.

Remember we said last month that if you didn't come across with news we would let Dodge loose at you? Well, the leash is strained to the breaking point, so watch out! — RALPH A. FLETCHER, *Secretary*, Post Office Box 71, West Chelmsford, Mass. HAROLD F. DODGE, *Assistant Secretary*, Bell Telephone Laboratories, 463 West Street, New York 14, N.Y.

• 1917 •

We regret to record the death, on January 10, of J. Carl Fisher. He was manager of the Customer Relations Department of the Consolidated Gas Electric Light and Power Company of Baltimore.

Clair Turner has been asked by the World Health Organization to conduct a preliminary survey of health education, and has drafted plans for the W.H.O. program in this field. He spent three months in Iran last year as a health expert surveying the health facilities of that country. Between times, he acts as assistant to the president of the National Foundation for Infantile Paralysis, with headquarters in New York, and was recently seen in New Mexico where he was consulting with the health education department of the University of New Mexico, in the latter capacity.

Al Lunn has been nominated for the office of president of the Alumni Association, which reminds us that prior to the Alumni Dinner and talk at Walker Memorial on February 4, Henry Strout arranged for a gathering of the local clan at the Engineers Club. In addition to several of the oldtimers, we welcomed two who had not previously been regular attendants: Paul deMars, consulting electrical engineer who had originally been associated with Jackson and Moreland's work in Puerto Rico and who is now active in the communications field; and Ray McDonald of the faculty of Holy Cross where he teaches — of all things — descriptive geometry. The latter lent an intellectual touch to the otherwise convivial atmosphere. Stan Hyde, who continues his school activities, had, as always, financial complications with which to contend — none serious. Rudy Beaver gave a discourse on the techniques of Lin Noyes' operations, supplementing it by a dissertation and general comment on Lin's courage and unflinching good spirits which will help him materially during the long convalescent period. (For the latest note from Mrs. Noyes, please see below). Gurney was concerned with several interesting explosions in the plants of New England Mutual's customers, explosions that at least kept his department interested in life. I. B. Crosby has spent three months looking over the Philippines for dam situations, with side trips to Greece for the same purpose. Sandell plans a renewal of the informal spring gatherings, possibly at Oyster Harbors, and the subject was explored in a preliminary way. Clarence Holt, Stan Lane, Jack Wood and Lobby were also seen milling around

Walker prior to the main talks, and Al Lunn was there with a most competent looking son and heir.

Mrs. Noyes wrote to Lobby late in January that on "November 29 . . . we had another surprise operation — the fourth in the series, too — and it was again necessary to screw our courage in order to meet this, the last stage in the process of removing ribs. Adam certainly had nothing on Lin, but his have not proved quite as fruitful, I would say. However, it was all in a good cause, too, and he is now improving rapidly and quite himself once more. He has been moved to a very comfortable room, is surrounded with his books, and has even come to the point where he thinks he can stand the tussle with his income tax. I'd say that was quite a step up the ladder to recovery, wouldn't you? Many a well man shies at the very thought of it." Lin's address is still Room 7112, University Hospital, Ann Arbor, Mich., and he would be glad to hear from members of the Class.

The Executive Vice-president, Harold E. Lobdell, travels over the country and meets numerous '17 men in many centers; for example, in Monterrey, Mexico, where he did not catch Pancho Sada but did have dinner with Eduardo Belden. Normally, however, he relays this information orally in spots where note taking is not especially practicable, and your Secretaries confess that they have not reported adequately the several news items he has passed along — nor do they feel that it is proper to urge the added chore of written documents on him during his brief visits to his headquarters. — RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge 42, Mass. FREDERICK BERNARD, *Assistant Secretary*, 24 Federal Street, Boston 10, Mass.

• 1918 •

Bill Wyer was thin and eager way back when he did a thesis on a project for the installation of block signals on the Northampton division of the Boston and Maine. But even before that, he had acquired a degree from Yale and a good record in extra-curricular activities. After that, being a bear for education, he got himself a sheepskin from the Harvard Business School. This made him a triple threat man, and led eventually to his being assigned "the most extensive investigation ever undertaken by the New York State Public Service Commission." As head of Wm. Wyer and Company, consulting engineers with offices in East Orange, N.J., since 1947; as former chief executive officer of the Central Railroad of New Jersey; as a graduate of Y T H Universities, Bill is well qualified. After World War I, Bill was assistant superintendent of transportation for the Norfolk Southern Railway Company, and later operating assistant to the president of the Denver and Rio Grande Western Railway. From 1929 to 1941, he was assistant to the chairman and later secretary and treasurer of the Missouri Pacific Railroad. He went with the Jersey Central in 1943 as chief executive officer of the road's trustees, taking with him a concise plan for the road's improvement. He increased

the road's net income \$3,500,000 a year.

He has recently expressed publicly his belief that railroads in general can effect sweeping economies by changes in motive power, exploitation of less-than-carload freight, adjustment of freight rates to meet competition, cuts in terminal costs and particularly by improved employee relations. The terms of his contract with the Public Service Commission for the vast Long Island task were not revealed. Nor was there any estimate of the inquiry's cost, which will be paid out of commission funds. A Long Island official said that the trustees of the road would have nothing to say on the investigation at the present time, and there was no indication how the announcement was received in the Long Island offices. Mr. Wyer could not be reached for comment on his plans. The Long Island — whose service, rates and finances have been under attack from many quarters for many years — now is undergoing reorganization and is controlled by trustees appointed by a Federal judge. The investigation, which started early in January, will take into account the railroad's commutation rates, basic fares, service, freight revenues and relationship with the parent Pennsylvania Railroad.

There are six general courses to be undertaken in the inquiry: 1. Reduce cost of carrying commuters during peak hours "to keep within the rates which can be charged without seriously injuring the communities on Long Island served by the railroad. 2. Develop non-commutation passenger and freight business. 3. Improve service "and particularly to increase the capacity of present facilities to carry rush-hour loads. 4. Study the proper allocation of costs between the Pennsylvania Railroad and the Long Island Railroad. 5. Study of compensation received by the Long Island in connection with operations of the New York Connecting Railway. 6. Study of the division of freight revenues between the Pennsylvania and the Long Island. Mr. Feinberg, Chairman of the State Commission, said: "The condition of the Long Island Railroad is a matter of vast public concern and involves complex and unusual questions which require special experience on the part of those dealing with them. The fortunes of this carrier affect the very livelihood of hundreds of thousands of people who are dependent upon it for daily transportation. Also, the ability of the railroad to provide adequate service at reasonable rates is closely tied with the development and growth of the Long Island territory served by the company. For these reasons, the commission is determined to make a thorough study of the underlying causes which have created the acute financial and operating problems of the railroad in an effort to provide a workable solution."

Eli Berman has opened another store, this time in Central Square, Cambridge. His other stores are in Boston, Malden, and Lynn. Berman Radio maintains a truck service for delivery of television sets in keeping with its advertised policy of "immediate delivery." Alexander Magoun, following 30 years of service on the M.I.T. staff, has been on a trip to

Florida where he ran into Albert Sawyer at Ormond Beach. Al is now southern district manager for his company, and is building a house but a stone's throw from "The Casements," John D. Rockefeller's winter home during the last 30 years of his life and where he died. Al says he used to play golf with John D., and proudly exhibited an autographed photograph of the famous oil magnate which was presented to his sister, then postmistress at Ormond Beach. Al's new house faces west on the river, the Atlantic Ocean being about half a mile to the east. Harold V. Kaler, who because of the War got his degree in 1919, though belonging to our Class, has gone his distance on this earth. He died on November 29 at the Roxbury Veteran's Hospital, age 53. He was an ensign in World War I, an engineer with the Crandall Drydock Engineers of Cambridge, a member of Lambda Chi Alpha, the Boston Society of Civil Engineers, and the Sharon Country Club. Burial was at Rock Ridge cemetery, Sharon. He leaves a widow, Taida; two daughters, Nadine V. Kaler, Mrs. Richard S. Whitney; and a granddaughter, Deborah. — GRETCHEN A. PALMER, Secretary, The Thomas School, The Wilson Road, Rowayton, Conn.

• 1919 •

The Midwinter Alumni Meeting at Walker Memorial was attended by Al Richards, S. Albert Kaufman, Maurice H. Role, Harry Cikins, Jesse Stam, Eugene Mirabelli and Hy Selya. Those present had an enjoyable evening and a good get-together.

Early in February the New York Times carried the announcement that the Western Electric Company, Inc., had appointed Timothy E. Shea as personnel director, effective March 1. We hope that this will bring Tim back to New York where we can see him once in a while; and here's our best wishes for big success in his new undertaking. — Howard McClintic, Jr., dropped a line to say that he is still in the contracting business with its usual "disappointments during the summer constructing season and the perversity of being awarded work during the winter. A little quail shooting helps, sandwiched between M.I.T. and charity drives." — George McCarten wrote that after he left the Norwich 30-year reunion, he went up to his own camp at Lancaster, N.H., for a month and had a good rest. Since then he has been hitting the ball in his business in Cleveland, Ohio.

Wirt Kimball sent considerable news as follows: "Saw John L. Riegel and William B. Snow at the Course XV Convocation for Presidents and Proprietors held by Professor Schell at the Algonquin Club in Boston on December 29. Larry, as you may know, is president of Riegel Paper Corporation and came on from New York, while Bill is president of Middlesex Products Corporation in Cambridge. Both look well. Hadn't seen Larry for 30 years. He said he would try to make the next reunion. I, as a manufacturer's representative for three companies, felt out of place in such distinguished company. We were the only '19 men there. Metcalf and Eddy an-

nounced on January 6 that Scott Keith had been admitted to the firm as a partner on January 1, 1950. Scottie had been with this firm since June of 1920 so his nearly 30 years with them has been rewarded. Waldo B. Clark still lives in Belmont, Mass. He has been doing real estate appraisal work for a bank for the past 15 years. With the exception of his youngest boy, all of Wally's children are married and most of them have made him a 'grandpop.' Haven't heard from K. T. Lee for several months now and with mails closed to Shanghai, am afraid it will still be some time. We sent our last letter to his Hong Kong address and it not only reached him but a reply found its way through to us. At that time, Katy did not sound too optimistic nor happy over conditions there, even though he didn't complain. Doubt if I could have written so calmly. As for myself, am handling three accounts for plant equipment manufacturers; and with New England as a territory, do not find too much spare time for anything else. While business could have been better during the first part of 1949, as you possibly know from your own company's activities, starting in November of last year, orders started coming to me in very satisfactory volumes and are continuing at a rate that should make 1950 by far the best year I have had since starting out on my own. Know from experience that it takes time to develop any new undertaking."

Albert Mayer writes: "Our normal work consists of large scale architectural and planning projects in the United States and elsewhere. Just now I am acting as consultant to the Public Housing Administration in Washington. Our firm does a good deal in urban and rural planning and development in India which includes: rural areas in the United Provinces; preliminary master plans for Greater Bombay and for Kanpur. Presently, we are making plans for a new capital city for the East Punjab (provincial) Government."

Changes in address include those of John M. Erving from West Hartford to 98 Garden Street, Hartford 5, Conn.; and J. Pickering Putnam from Watertown, Mass., to 48 Beacon Street, Boston 8, Mass. — EUGENE R. SMOLEY, Secretary, The Lummus Company, 420 Lexington Avenue, New York, N.Y. ALAN G. RICHARDS, Assistant Secretary, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

• 1920 •

We are getting indications already that our 30th reunion at the Sheldon House, Pine Orchard, Conn., starting June 9, is going to be the biggest and best ever. For example, A. D. Higgins, Colonel and Commanding Officer of the New Orleans Port of Embarkation, says that he definitely plans to take in the reunion as it will be the first time he has been in the United States for a reunion in a considerable period of time. Ed Farrow writes that he has planned to be on deck for the 30th ever since the 25th which he, in common with the rest of us, so thoroughly enjoyed. He says, outside of plans for a European trip, a son graduating from

Williams College, an M.I.T. Corporation Meeting and a meeting of the officers of his fraternity at Columbus, Ohio, he has nothing to do the week end of our reunion and he plans to be there at least part of the time. Al Glassett has a good committee including such able classmates as Al Burke, in charge of Sheldon House arrangements, Larry Davis, in charge of rounding up "friends" of the Class, and Flossie Fogler Buckland, in charge of rounding up our numerous co-eds. A note from Flossie indicates that Dorothea Brownell Rathbone is interested in the reunion. Flossie says that she is impressed by the fact that M.I.T. is accepting younger and younger students; for example, her own son who is a sophomore in Course II.

It was pleasant to receive word from Johnnie Rockefeller who heads J. W. Rockefeller, Jr., and Associates, consulting engineers at 140 Cedar Street, New York. Johnnie is an expert on printing plant production and cost control, and a series of articles on this subject has been appearing in one of the leading printing magazines. Art Atwater has been made executive vice-president of Thomas Bryan and Associates, Inc., engineers and contractors in Houston, Texas. Art's address is 2021 Southgate, Houston 5. We certainly hope he can get up to the reunion. Captain Russell Hitchcock has left Massachusetts and is now in Bath, Maine. Malcolm Howe is also in Maine but has moved from South Portland to Augusta. Rear Admiral Arthur C. Miles has left Washington for Los Angeles. Captain Edward Ellsberg continues to receive nationwide attention and acclaim. His 14th book, *No Banners, No Bugles* has recently been published. He makes his home at Southwest Harbor, Maine.

Since hearing from Austin Higgins regarding the reunion, I have secured further information about his interesting career. He has assumed command of the New Orleans Port of Embarkation, having previously been director of the Ground Division, Office of Military Programs at Washington. Austin has had a long military career, having served as an officer in three branches of the armed forces, the Marine Corps, Navy and Army, during and after World War I and on two fronts during World War II. Early in the last War, he had various commands in North Africa, later becoming port commander at Oran, Algeria. In 1944 he organized the Riviera Recreational Area in Cannes and Nice, France. He was later assigned as commanding officer of the Lyon Depot and then as commanding officer of St. Victoret Staging Area near Marseille, and finally as port commander of Glasgow, Scotland. His unit was twice awarded the Meritorious Service plaque.

In the summer of 1945, Colonel Higgins took the 7th Major Port to the Pacific Theatre of Operations and became port commander at Nagoya, Japan, as well as transportation officer of Nagoya Base. Following this service, he became chief of transportation on the staff of Joint Task Force Number One for Operations Crossroads at Bikini. He was later detailed to the State Department in the Foreign Liq-

uidation Commission, serving as a field commissioner at Guam. Following this assignment, he served as chief of transportation for Office of Foreign Liquidation at Heidelberg, Germany, and later was again transferred to become central field commissioner for Latin America at Balboa, Canal Zone. Among his many decorations are La Médaille de la Reconnaissance Française, the Legion of Merit for services in Africa and the Commendation Ribbon for services in Japan.

The time is fast approaching, fellows, so get yourselves set for the big reunion. If you have any questions, just get in touch with Al Glassett or — HAROLD BUGBEE, Secretary, 7 Dartmouth Street, Winchester, Mass.

• 1921 •

Top news of the month — Irving D. Jakobson has accepted the chairmanship of our 30th reunion committee. Irv, who heads the Jakobson Shipyard, Inc., of Oyster Bay, N.Y., and our Class President, Ray St. Laurent, met recently to set up the organizational machinery for the 1951 celebration which is tentatively scheduled for a period of several days preceding Alumni Day at Cambridge on June 11, 1951. Start now to make your plans to be there and sell the same idea to others of the Class in your area. It should also be noted that Alumni Day will occur on June 12 this year. We will have the usual Class party at 4:00 P.M. that afternoon in the Copley Plaza, preceding the annual banquet.

More top news of the Class organization concerns Henry R. Kurth, who has agreed to stand for re-election for another term as our representative on the Alumni Council. Chick, who is with Boston Edison, has served us well for many years and his name appears on the ballot this spring for you to indicate your appreciation. Chick was instrumental in calling the Boston 1921 group together for the Midwinter Meeting of the Alumni Association in Walker Memorial early in February and he has written a brief account of the proceedings. Among those present were: Dick McKay and Jack Sherman of the Federal Reserve Bank of Boston; Don Hatheway of Boston Edison, who spent a month in various Westinghouse Electric factories and laboratories with other utility engineers in a review course on power system apparatus and design; Harty Flemming, general engineer with New England Gas and Electric Association; Harry Rosenfield, who owns the large National Laundry Company; Winthrop Luke, who is on the faculty of Wentworth Institute in Boston; Steve Seampos, who has his own refrigeration and air conditioning sales and service company; Joe Kaufman, who is moving his radio, television and appliance store to larger quarters on Province Street, Boston. Also, Larry Chellis, Josh Crosby, Ed Delany, Chick Dube, Norm Ferguson, Roy Hersum, Ed MacDonald, Harry Myers, Phil Nelles and George Schnitzler. Chick says that Murray Jones is now superintendent of rates and statistics for Boston Edison and that John Buckley is rate engineer. He also reports a meeting

with Harry Granger, who is the town treasurer of Weymouth, Mass.

A welcome note from Herb DeStaebler, Vice-president of Lambert Pharmacal Company and St. Louis secretarial committeeman, says: "Gene Weil, Vice-president of G. S. Robins and Company here, was elected president of the M.I.T. Club of St. Louis at the annual meeting. Our son, Herbert, Jr., graduates from Technology next June 9 and his brother, Stephen, graduates from high school on the same day. We haven't solved that one yet!" A recent speaker before the Bridge Builders of Malden, Mass., was Laurence H. Banks, Boston City Councilor from the Roxbury district. A graduate of Boston English High, Larry attended Technology and Boston University and received a degree in law at Suffolk Law School. He is a member of the Boston Bar Association, the Massachusetts and Suffolk Republican Clubs, the American Legion and a former representative of the Roxbury district in the state legislature. Dave Woodbury's latest book, *A Measure for Greatness*, a biography of Edward Weston who founded the Weston Electrical Instrument Company, is referred to in an article on famous inventors of New Jersey, appearing in the Newark *Sunday News* magazine section. — Sincere sympathy is extended to Munnie Hawes on the passing of his mother.

In a recent letter to Ray, our photo-historian, Bob Miller, says: "During the holidays we had the usual cheerful word from Bill Sherry and Joe Gartland. Helier Rodriguez had some sad news to report. While they were entertaining Massachusetts friends on their sugar plantation just before the end of the year, word was received of the sudden illness of Graciela's mother. Before they could return to Havana, she died. It must have been a cruel blow coming so suddenly and just before Christmas." Bob is doing consulting work for the Brewer-Tichenor Corporation in Cortland, N.Y., manufacturers of stampings, drop forgings, pole line hardware, metal chairs, banquet tables, ironing boards and frozen food display cases. He makes his home in Rochester, N.Y. Herman F. Finch has left the Canal Zone and is a neighbor of Earl McBroom in Sacramento, Calif. Laurens M. Hamilton now makes his home at The Plains, Va., and Watts S. Humphrey is in New York City with Clark, Dodge and Company, 61 Wall Street. Lewis W. Moss has moved from Chicago to Columbus, Ohio, and Horace B. Tuttle has a new home in Bloomfield, Conn. Don G. Shingler, a brigadier general, has been assigned to a new post in St. Louis. Richmond H. Skinner, a lieutenant colonel in the Chemical Warfare Service during the war and recently the operator of a flying and aerial photographic service in Alton Bay, N.H., is reported to be back in service in Washington with the rank of major. A. Warren Norton has moved to a new home address in White Plains, N.Y. The Chicago *Tribune* reports the election of L. George Horowitz as first vice-president of Arthur Rubloff and Company, Chicago. George was graduated from West Point and M.I.T. and served with the Corps of Engineers during the last War in Europe,

Asia and this country. A lieutenant colonel prior to going on inactive duty in 1945, he subsequently became associated with the City Investing Company and then opened his own office in New York as a consultant on real estate economics.

We were most pleasantly surprised to receive a visit from Harold O. Bixby, former colonel, Signal Corps, who had been with that branch of the services since our graduation. He is now a consultant with the U.S. Services in St. Thomas, V. I., engaged in communication work. He has a married daughter, a former WAC corporal, who now lives in Maine, and a son living in St. Thomas who was a sergeant in the Marine Corps. Bix has promised to be on hand at our 30th reunion. A New York *Herald Tribune* illustration shows Homer N. Wallin, rear admiral and commandant of the Norfolk Navy Yard, examining the hull of the amphibious *Missouri* in drydock with her split personality showing. Jack Barriger, President of the Monon, takes the news spotlight with publication of a message to the Interstate Commerce Commission and the American Association of Railroads. Since his line is completely dieselized, Jack has offered to handle additional freight and passenger service in the coal emergency.

An enjoyable luncheon was spent with A. Abba Orlinger following his phone call to advise that he has opened his own office at 20 Pine Street, New York, as a counselor-at-law in patent and trade mark matters. Having served for more than 11 years in similar work for Sharp and Dohme, Inc., of Philadelphia, he has recently been appointed by the American Bar Association as a member of the committee on Patent Office practices relating to chemical inventions. Following graduation in Courses X and X-A, he was associated with the Henry Souther Engineering Company, the Central Dyestuff and Chemical Company and the Grasse Chemical Company until 1928. He was graduated from the St. Lawrence University Law School in 1929 and admitted to the New York bar. He carried on his own practice in the chemical and chemical engineering field until joining Sharp and Dohme in 1937, where he served as chairman of the patent and trade mark committee of the American Drug Manufacturers Association. He was also a member of the board of governors of the Philadelphia Patent Law Association and is currently on its chemical practices committee. Abba makes his home in Philadelphia. He and Mrs. Orlinger have two daughters, one married last September and the other in high school. He reported that Carl Hasslacher has his own business in New York in the development of mechanical specialties and that Herb Kaufmann is with the metal manufacturing firm of Treitel-Gratz Company, Inc., of New York. Goodman Mottelson is plant superintendent of the Wilson Laboratories of Wilson and Company, Chicago.

A welcome call came from Joseph J. Schaefer, thanks to Abba, and we learned that Joe has opened his own offices in the Chemists Club Building, 50 East 41st Street, New York, as a chemical consultant covering a wide field from technical assistance and research to market analy-

sis, economic surveys, financing, and personnel. Joe has been in New York about a year, following four years in Wyandotte, Mich., as director of development of the Wyandotte Chemicals Corporation. He was graduated from the University of Dayton and served as an assistant instructor in organic chemistry at Technology, receiving his master's degree with our Class. Subsequently, he had various assignments in his father's cigar business and then became an instructor in chemical engineering at the University of Dayton. In 1928, he joined the Niacet Chemicals Corporation, Niagara Falls, N.Y., in research and process development. In 1934, he became director of research and later vice-president of Sharples Chemicals, Inc., of Philadelphia, being elected a director of the company in 1942. Joe holds many memberships in professional societies and is a past chairman of the Detroit section of the American Institute of Chemical Engineers and past director of the Commercial Chemicals Development Association. He and Mrs. Schaefer have two children. Joseph, Jr., M.I.T.'44, attended Harvard Business School after Army service and is with Horn and Hardart in Philadelphia. Daughter Mary, who majored in chemistry and languages at Laval University, Quebec, is married and living in Quebec.

A letter or call from you will be greatly appreciated. — CAROLE A. CLARKE, *Secretary*, International Standard Trading Corporation, 67 Broad Street, New York 4, N.Y.

• 1922 •

In the December, 1949, issue of the *M.I.T. Development Program News*, appeared the pictures of Larry Davis, Whit Ferguson and Ed Ash, all of whom have been active in the campaign. At the Development Program dinner meeting at the Waldorf-Astoria in New York last November 9, Dunc Linsley was one of the speakers. Dunc was also toastmaster at the M.I.T. Alumni dinner for Northern New Jersey on October 21 at the Hotel Essex. On this occasion, Ev Vilett was one of the hosts. The following were present at the annual Midwinter Meeting at Walker Memorial on February 4: Warren Ferguson, Parke Appel, Jack Hennessy and his son who is at Roxbury Latin School, Morris Gens, Bill Russell, Bill Freeman, Al Abboud, Clift Richards and Bob Brown.

The following is from the Newton, Mass., *Villager*: "John W. Kellar, well-known Newton resident and Chairman of the Newton Planning Board, was elected a Director of the Newton National Bank at the annual stockholders' meeting held January 10, 1950. Kellar is a Trustee of the West Newton Savings Bank. He resides at 300 Linwood Avenue, Newtonville with his wife and three children and is engaged in the general building and contracting business." — The *Hartford Times* of January 3 reports that John C. Molinar has been appointed manager of domestic small tool sales for the Pratt and Whitney Division of Niles-Bement-Pond Company. Molinar has been with Pratt and Whitney since his graduation from Technology.

New addresses: Edward B. Schwamb, 23 Davis Avenue, Arlington 74, Mass.; Keith W. Robbins, Hotel Lycoming, Williamsport, Pa.; George D. Ramsay, Lone Star Steel Company, 4152 Mockingbird Lane, Dallas, Texas. — For the benefit of those members of the Class who like to lay their plans far in advance, your Secretary has been advised by the Alumni Office that the Alumni Banquet can be expected to be held on Monday, June 9, 1952. This means that our 30th reunion in 1952 will be scheduled for Thursday, Friday, Saturday and Sunday, June 5, 6, 7 and 8. — C. YARDLEY CHITTICK, *Secretary*, 77 Franklin Street, Boston 10, Mass. WHITWORTH FERGUSON, *Assistant Secretary*, 333 Ellicott Street, Buffalo 3, N.Y.

• 1923 •

I will repeat the announcement that in accordance with the new class constitution, there will be a meeting of the Class on Alumni Day, June 12, in a room assigned to the Class at the Copley Plaza Hotel at approximately 5:00 P.M.

John H. Zimmerman had the distinction of being the one new class officer elected by the recent mail ballot becoming, thereby, vice-president of the Class. This is, undoubtedly, less important in his mind than another event on which I have just received information. He was married in January at a ceremony at Christ Church, Methodist, in Bronxville, N.Y. The youngest of his three sons, by a first wife now deceased, served as best man. The bride was Mrs. Margery Holmes Hughes of Whitman, Mass., and a graduate of the Massachusetts School of Art. Jack is development manager of the Gas Group of Union Carbide and Carbon Corporation in New York. — I had a newsy letter from Herb Hayden, who is works engineer for E. I. duPont de Nemours Company, Arlington, N.J. He said he was in Cleveland in January and, through the courtesy of Doc Smith, attended the informal dinner get-together of a number of M.I.T. men to greet Horace Ford. For personal news, he reports a second grandson. His boy, Bill, who has a master's degree in Chemical Engineering from Bucknell, is the father. His oldest daughter, Helen, was also married in November and his youngest daughter expects to graduate from Middlebury in June.

In February, William Webster, Vice-president of the New England Electric System, Boston, was nominated by President Truman to be chairman of the Research and Development Board of the National Military Establishment, succeeding M.I.T. Corporation Chairman Karl T. Compton in that important office. In recent years, Webster has been chairman of the Military Liaison Committee of the Atomic Energy Commission. — Walter F. Munford was elected, in January, a vice-president of the American Steel and Wire Company, Cleveland. In this job as vice-president in charge of operations, he will continue to be in charge of the development and production of more than 70,000 items turned out by the company's 14 plants. Munford started with the company in Worcester and has worked at various plants of the company at Cleveland, Lo-

rain and Pittsburgh. He lives at Gates Mill, Ohio, is married and has two children.

Three members of the Class have been singled out for special honors recently. In December, Professor Edward R. Schwarz, Head of the Textile Technology division at M.I.T., was made a Fellow of the Textile Research Institute. In January, Eger V. Murphree, President of the Standard Oil Development Company, received the Perkin Medal for 1950. This medal is presented annually by the American section of the Society of Chemical Industry. Also in January, it was announced that George W. Gilman, Director of Transmission Engineering, Bell Telephone Laboratories, will receive this year one of the Fellow Awards conferred by the Institute of Radio Engineers.

I regret having to report the death in Milton, Mass., of Lloyd S. Becket, chemical engineer for the state of Massachusetts. He at one time worked for the Holtzer Cabot Company, Jamaica Plain, and was a native of Calais, Me. He is survived by a wife and a son.

The Midwinter Meeting of the Alumni Association in February was well attended by 1923 men. I did not make a list but among those present were: R. D. Brown, R. T. Colburn, Joseph Fleischer, Edward Fox, F. K. Haven, D. W. Height, A. R. Holden, George A. Johnson, S. P. MacDonald and D. W. Skinner. There were also a number of others and several took advantage of the Alumni Association's suggestion to bring along sons who might be interested in the program. — Various members of the Class are actively helping with work of the M.I.T. Development Program, which is separately reported in *The Review* and in special bulletins. Marshall Dalton's report at the Midwinter Meeting is reason enough to be optimistic of the success of the Development campaign. — HORATIO BOND, Secretary, National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass. HOWARD F. RUSSELL, Assistant Secretary, Improved Risk Mutuals, South Broadway, White Plains, N.Y.

• 1924 •

Hank Simonds, the professional globe-trotter, was in Boston in January completing his 12th round-the-world passage. He was stopping long enough in New York to pick up a two-and-a-half stripe reserve commission in the Navy. As usual, he looked up everyone of us he could find on this trip. In Hong Kong, he and Jimmie Wong got a big kick poring over the pages of our 25-year book. Jimmie thought Ike Lee was the least recognizable of the lot. After all, there's plenty of room in Texas for expansion! And in Manila, Hank spent some time with Cris de los Reyes, but couldn't catch up with Emilio del Prado. He wanted to, just to see what the grandchildren score was. "Must be about 20 by now." Of course, that was just a rough estimate. He also passed the word that Royce Greatwood, after a six-months' stay in this country, has gone back to Japan. He's in Kobe, Number 2 man in the Army controlled

Japan Oil Company. Don't know what your Secretary would do without the roving reporter.

Probably Paul Cardinal will say this proves how much less busy your Secretary is than he. I actually saw Phil Bates. He dropped in one morning recently on his way to a meeting. Phil is on the Visiting Committee of the Department of Food Technology. Incidentally, he is no longer president of the Cabot Chemical Company; not a change in job, just name. It is now the J. W. Dart Laboratories, Inc. Here's a little item in the line of coincidence from Bob Considine's syndicated column: "Jimmie Doolittle won his wings when he was 21. His son, Little Jimmie who stands about a foot higher than his illustrious pop, gained his wings at 21. Jimmie Sr. was married at 23; so was his son. Each had a son at 25. Each was sent to Wright Field as a test pilot at 26. Each had another son at 27. Both were sent to M.I.T. by the Air Force at 28." Let's hope the parallel stops before Jimmie, Jr., reaches his father's Tokyo-raiding age.

In January, Raymond L. Bowles, Armstrong Cork's production planning manager, "well-known in industry for his talks and articles on his original approach to the problems of inventory control and employment stabilization," addressed a meeting of accountants in Worcester, Mass. When Dr. Compton was forced to relinquish his Washington job last November, George Parker dropped him a note on behalf of the Class, expressing our regret at his illness and our hope for a speedy recovery. Now that he is back in his office at the Institute again, he is catching up on his correspondence and sent us all a note of appreciation. Incidentally, he's looking fine, has all his old-time spirit and seems to have made a complete recovery. And there's news on two scores from George himself: Item 1, he was caught in the sudden and unexpected closing of the Waltham Watch Company, is now footloose temporarily. Remember all the discussions we had at the Cape about who had the youngest child—Whoever won may as well give up. Item 2, the Parkers are expecting another child in June or July. Still hoping for a boy after a long run (four) of girls.

Frederick E. Terman, Dean of Stanford's School of Engineering, was awarded the Institute of Radio Engineers' Medal of Honor in March "for his many contributions to the radio and electronics industry as teacher, author, scientist and administrator." Dean Terman got his doctorate in Electrical Engineering with us. During the War, he was in charge of Harvard's Radio Research Laboratory and was decorated by both the British and United States governments.

A call from Bill Robinson brought forth the news that his nuptials, previously announced as due in the late spring, had been set ahead to March 11. "Just a good job of selling," says Bill. That road show of Bill's, "Horizons Unlimited," has been so successful that he's spending most of his time on tour these days. Hope he was able to be in Cleveland on the 11th! — HENRY B. KANE, General Secretary, Room 1-272, M.I.T., Cambridge 39, Mass.

• 1925 •

There is still time to make plans to attend your 25th reunion. If you have not already replied to the notices mailed to you, please help the committee and do so immediately. The first notice of the reunion plans has brought several interesting bits of news regarding various classmates.

B. J. Connell sent in the following information as reported in the Honolulu *Star-Bulletin* of January 28: "B. J. Connell has established his own real estate business in Room 403 in the Boston building. For the past two years he has been associated with the Real Estate Exchange. Mr. Connell's first trip to the islands dates back to 1925 when he was serving as a lieutenant in the navy. At that time he was the pilot on the historic John Rodgers flight, the first attempt to fly from the Pacific Coast to the Hawaiian islands. When forced by gas shortage to land short of the islands, the crew sailed their seaplane to the island of Kauai where they arrived 10 days later. Mr. Connell is a graduate of the Pennsylvania State College and, after completing a post graduate course at . . . Technology, received the degree of master of science.

"In 1934 he served as general inspector of naval aircraft, central district; in 1938, as head of the production planning department at the naval aircraft factory, Philadelphia, Pa. In 1941, Cmdr. Connell represented the navy in the aircraft scheduling and critical materials allocation branch of the war production board. In 1943, he was ordered to the naval air station, Alameda, Calif., as head of the aircraft overhaul department. At the time of his retirement from the navy, after the war, he was serving as navy representative at the Douglas Aircraft Co. The Connells reside at Lanikai. . . . They have a son at Stanford university and a daughter who has recently returned home after graduation from Stanford."

Mrs. Nicholas A. Draim sent in a very nice note regarding Captain Draim, XIII-A. He has been in Moscow since September, 1949, as Naval Attaché and Naval Attaché for Air. His son John was graduated from the Naval Academy in June, 1949, "with distinction" and is now attached to the U.S.S. *Damato* at Norfolk and looking forward to flight training in the near future. His daughter Dorothy is a Fine Art student at Syracuse University in her second year, while the second daughter, Carolyn, is finishing junior high school this year. Mrs. Draim and her two daughters plan to join Captain Draim this summer. Captain Draim has been interested in mathematics and during the past summer, he delivered a lecture on "The Fundamentals of Mathematics" on four consecutive evenings in English, French and Russian.

Finally, a note from H. Royce Greatwood, IX-B, reaches me from Japan. He is with the Japan Oil Storage Company handling petroleum supplies for the Army, Navy and Air Corps. He went to Japan in 1946 after being placed on inactive service by the Navy. He has had an interesting experience watching the rehabilitation of the country under General MacArthur. Although he doubts that he

will be able to attend the reunion, there is a possibility that he may fly to England this spring and if the timing is right, he will certainly plan to join us. — HOLLIS F. WARE, *General Secretary*, Apartment 206, 106 Schuyler Road, Silver Spring, Md. F. LEROY FOSTER, *Assistant Secretary*, Room 5-105, M.I.T., Cambridge 39, Mass.

• 1926 •

This month I am departing from my usual practice of leisurely writing these notes over the week end at Pigeon Cove and instead am talking into the Dictaphone in my office during a snowy, February noon hour. The news clipping services have been kind this month and have sent along items about several of our classmates.

Our two ecclesiastical classmates have been in the news during the same month. Reverend Arthur J. Riley, curate at St. Peter's Church in Plymouth, Mass., has been commissioned to write a history of the Knights of Columbus, but I cannot determine from the press release whether these new duties are in addition to his duties at Plymouth or not. The notice is sent from New Haven where the Knights of Columbus was founded, so perhaps Arthur Riley will be moving there to have access to the records. The press release goes on to give a great deal of Arthur's background; but since we covered that in a recent issue, we will not repeat it. Do a good job for the K. of C., Arthur, and we will someday commission you to write a history of the Class of 1926. From Waterville, Maine, a clipping tells that our classmate, Reverend Malcolm A. MacDuffie, was recently chosen pastor of the First Church, coming there from the First Church at Ellsworth, Maine. This article also gives some background and I will repeat a bit of it because it is interesting to me to see by what route an M.I.T. graduate arrives in the ministry. It seems that after graduating from the Institute, Malcolm taught school in Newton, Mass., and also taught at M.I.T., meanwhile attending the Harvard Graduate School of Education. His father and mother were founders of the MacDuffie School for Girls at Springfield, Mass., and he went there to teach in 1928, becoming copricipal of the school with Mrs. MacDuffie in 1936. In June, 1941, he decided to enter the ministry and graduated from Bangor Theological Seminary in 1944, so actually his call to the cloth was quite recent. I am glad to have this one straightened out because I had been trying to figure out how an electrical engineer, a chemist or a business administrator could possibly get into the ministry. In a recent issue I mentioned that Marron W. Fort had tossed his hat into the political ring by running for councilor-at-large in Newburyport. I have two clippings from Salem newspapers referring to speeches by Dr. Fort, councilor-at-large in Newburyport, so it appears that he has made the grade politically. Congratulations, Marron. George West also appears to have taken up oratory having recently spoken to the Merrimac Valley chapter of the National Association of Cost Accountants. George is assistant manager of the

Special Service Department of Ernst and Ernst, the national accounting firm with whom he has been connected since 1932. I have just come across another clipping in my folder which definitely states that Arthur Riley is leaving Plymouth and will be gathering his historical information from all parts of the United States and will even travel abroad to obtain it. Here's a clipping from a London magazine about Harry W. Pierce who has just been elected first vice-president of the American Welding Society, New York. Why we have to go to London for clippings like this, I can't quite figure out, but Harry Pierce was a graduate student in Naval Construction at the Institute in the Class of '26. He is at the present time assistant to the president of the New York Shipbuilding Corporation, Camden, N.J., and has been associated with this organization since 1930. During this 20-year period most of his work has dealt with welding and ship construction and he has served on many advisory committees investigating welded stresses in ships, so he has plenty of background for the new assignment. Congratulations, Harry Pierce.

The annual Midwinter Meeting of Boston Alumni was held at Walker Memorial on the 4th of February and it had special interest this year for your Class Secretary since the guest speaker was Larry Livingston of the DuPont Company with whom our classmate, Jim du Pont, is associated in Wilmington. I was so busy counting noses at our own table that there was not time to see how many there were at other class tables. I am going to make claim that our Class had the largest representation, anyhow. The Alumni are invited to bring their sons with them at these midwinter meetings, and a number of our Class did so. Including these younger guests and including Jim Killian, who was at the head table, of course, there were 22 for the Class of '26. Phil Mancini came up from Providence with his sons, Phillip, 11, and Stephen, 9. Phillip, Senior, is certainly planting the M.I.T. idea very early with his sons, and we hope that it takes. Al Dolben was there with his son, David, who is 14, and Stewart Perry brought his two boys, Jim, 16, and Skip, 19. Skip is a student at the University of New Hampshire. Frank Toperzer had his son, Mickey, with him, and we understand that Mickey is quite a high school hockey player. Ben Margolin brought his nephew, Dave Wise, along, presumably with the thought of doing a little promotion work for M.I.T. since Dave is a 17-year-old student at Brown and Nichols. Ted Mangelsdorf was too far away to attend a Boston meeting since he is superintendent at the Lockport, Ill., works of the Texas Company, but it certainly was a treat for all of us to have Ted's two boys present who are both students at the Institute. Ted, Jr., is in the Class of '51, Course VI, and Fred is in the Class of '53, Course II. We enjoyed having them with us very much. You certainly have a couple of boys there that you can be proud of, Ted. The rest of the gang who attended the meeting were Malcolm McNeil, Cedric Thompson, Irving Cowperthwaite, Bill Hinckley, Marvin Pickett and D. Sicari de Amicis. The latter recently came back to Boston from Cali-

fornia and has established an electronics laboratory in Lexington, Mass. All in all it was an excellent meeting, and Jim Killian's report to the Alumni was presented with his usual forceful clarity, being received with great enthusiasm by the entire group. During the period between dinner and the meeting, Jim came around to meet the gang and the young guests of our group certainly got a kick out of shaking his hand.

In response to our requests for material for the class notes, George Breck has really come through. He has written a complete résumé of his activities since leaving the Institute and we will publish it next month. By then we hope to have notes from various other members of the Class, but we want you to read George's letter and derive from it inspiration to send us a similar story. — GEORGE WARREN SMITH, *General Secretary*, E. I. du Pont de Nemours and Company, Inc., Room 1420, 140 Federal Street, Boston, Mass.

• 1927 •

After almost 20 years of silence, we have news from Elmer Andrews: "Have worked for Eastman Kodak Company from 1927 until now. At first as a chemist, then as a chemical laboratory foreman, then for about six years in semiplant scale engineering research. From 1936 through 1947 was in the Kodak Park engineering department concerned particularly with installing film processing equipment and regular building fixtures (heating, air conditioning, and so on) in various Kodak plants. This took me for months at a time to Chicago, Los Angeles, San Francisco, New York, and Washington as resident engineer, and it was very interesting. This process was interrupted from 1941 through 1945 for duty in the armed forces. Was in the Army but had the strange and interesting experience of special duty with the Navy at Anacostia Naval Air Station, Washington, D.C. In fact, out of 57 months of duty during the War, I spent 44 months with the Navy. Was captain and major most of the time and finally lieutenant colonel at the end. Am now settled down with E.K.C. as chief engineer, main office. Been married 20 years; have two sons, 18 and 14. Oldest now in college. Younger one will be the engineer. Hobbies gardening and sailing a Lightnin'."

A recent item in the Watertown Sun, Watertown, Mass., announces the engagement of Frank J. Crandell, 24 Beverly Road, Wellesley, to Dr. Alice M. Broadhurst. Frank is assistant vice-president of Liberty Mutual Insurance Company. The wedding is set for later this year. The Albany Times-Union announced the engagement of Arthur Willink, Major, U.S.A. retired, of Greenfield Center, N.Y., to Ruth Evans Myton. Prior to his retirement, Major Willink was stationed at Watervliet Arsenal. The wedding will be in the summer.

The Franklin, Mass., Sentinel gives a description of the 50th anniversary celebration of Mr. and Mrs. Alfred G. Leach, who are the parents of our Edward A. Leach. Ed is sales manager for the Sanguamo Electric Company of Springfield,

Ill., where he makes his home. Previous to this, he was associated for 17 years with the General Electric Company at Schenectady, N.Y. The Ed Leach family consists of three children; a daughter and two sons.

At the Institute of Aeronautical Science dinner held at the Astor Hotel in New York City I saw Messrs. Gillies, Knowles, and Kurt and we all had an excellent opportunity to talk things over. Your Secretary would appreciate news items from classmates who have not kept us up to date on their activities. These bits of gossip keep us in touch with one another and also make the class notes interesting reading. — JOSEPH S. HARRIS, *General Secretary*, Shell Oil Company, 50 West 50th Street, New York, N.Y.

• 1928 •

At long last some news has percolated through to me about accomplishments of members of our Class. I know you will be as pleased as I am to see 1928 notes once again in *The Review*. Our heartiest congratulations go to Edward H. Holmes, chief of the highway transport research branch of the Bureau of Public Roads for his exceptional service to this department of the government. Ever since graduation, Ed has been associated with this bureau. Their official release, in speaking of his work, reads as follows: "Edward H. Holmes, chief of the highway transport research branch of Public Roads, received a silver medal for 'exceptionally competent performance as a leader in research work.' Mr. Holmes, a native of Kingston, Mass., was graduated from . . . Technology in 1928 and immediately accepted an appointment as junior highway engineer in Public Roads. In 1929 he was awarded the Russell Erskine traffic research fellowship at Harvard University for a year of postgraduate study. Returning to Public Roads the following year, he engaged in the first exploratory studies of driver behavior and traffic flow as a basis for determination of the traffic capacity of highways. Since that time he has rendered valuable assistance to State highway departments as an advisory representative of Public Roads in highway planning studies and traffic surveys. He was promoted to his present position with Public Roads in 1945."

Word from California reveals that Henry B. Dean is enjoying his life as a farmer. His new address is Box 108, Route 2, Fallbrook, Calif. From Japan we learn that Shikao Ikehara survived the War and is now carrying on his teaching activities at Tokyo Kogyo University in Tokyo. Harold D. Morrill, I, has just returned to this country from Germany after having served a long period in the Army. His present address is 21 Sycamore Avenue, Mt. Vernon, N.Y.

I would greatly appreciate it if you men would keep either me or Ralph informed of your busy lives so that we could attempt to have more information in *The Review*. — It won't be long now before our 25th reunion in '53. — GEORGE I. CHATFIELD, *General Secretary*, 49 Eton Road, Larchmont, N.Y.

• 1930 •

At the Midwinter Meeting of Greater Boston Alumni, your Secretary was glad to see Charlie Abbott and his son, a freshman at the Institute, Tom Connor, Enoch Greene, Jack Latham and his son who is a second-year student at Roxbury Latin School, Jim Muir, Hermon Scott, and Fred Trescott. After a short stay in this country, John Worcester has left again for Buenos Aires, where he is with the National Lead Company. Alan Vint is a member of the firm of Alderfer-Vint in Akron, Ohio. His former home was in Reading, Pa. Bertwell Whitten has been promoted to technical assistant at the Everett plant of the Boston Consolidated Gas Company. He has been with that company since 1930.

We hope that you are making plans to be with your classmates at Saybrook, Conn., for our 20-year reunion on June 10 and 11. With Alumni Day at the Institute scheduled for June 12, why not plan to make it a full week end? Your committee is working hard to provide a fine program for all who attend. — PARKER H. STARRATT, *General Secretary*, 1 Bradley Park Drive, Hingham, Mass. *Assistant Secretaries*: ROBERT M. NELSON, 2446 Iroquois Road, Wilmette, Ill.; ROBERT A. POISSON, 150 East 73d Street, New York 21, N.Y.

• 1931 •

Ben Steverman, who knows from experience the difficulties of a class secretary, comes to this column's rescue with the following letter: "Here is a brief account of my gyrations since I last saw you. In April, 1947, we moved from Winchester, Mass., to Rochester, N.Y., where I established myself as a manufacturer's representative. Shortly after settling in our new surroundings, our fourth daughter, Jule, was born on July 19, 1947, so we now have four girls: Faith, eight; Hope, five; Clare, four; and Jule, two. After a year and a half in Rochester, I accepted a position with the Taylor Instrument Companies as salesman in the Northern and Central Ohio area. This involved training at the factory in Rochester for six months, and then moving out here in June of 1949. My address is: The Taylor Instrument Companies, 1049 Leader Building, Cleveland 14, Ohio.

"While in Rochester, I saw several '31 men. Bob Baxter is with Ansco in Binghamton, N.Y. Elmer Hughes is with the Easy Washing Machine Company in Syracuse, and was also conducting a course in business administration at Syracuse University. Glenn Goodhand was with the Kryptar Company in Rochester, but later decided to return to the Army as an Air Force major and is now in Arlington, Va. Hal Genrich is building houses in Buffalo, and Carlton Nicholson is chief power engineer with the Niagara Hudson Power Company in Buffalo. Since moving to Cleveland, I've seen Dan Connelly who is with Republic Steel here. Dan had a letter recently from Art Demars who has been in Puerto Rico for Jackson and Moreland for several years. He is now back in Boston with his bride, whom he married while in Puerto Rico. Clare and I went to a Cleveland Tech night recently with Bob Knight and his wife Evelyn. Bob

has been with American Steel and Wire since school days, first at Trenton, then at Worcester where he was superintendent of the wire spring plant, and now in Cleveland as assistant sales manager for the spring division. While visiting in Florida last winter, Bob saw Jack Wilkinson. Willie is at Key West, and has gone in for the outdoor life as a superfisherman." Many thanks for the letter, Ben.

We have a fitting postscript to our references to Frank O'Leary in the November Review. Last January, he was married to Alice M. Anderson, a graduate of Upsala College and formerly chief of the pathological laboratory of the Middletown, Conn., hospital. Another '31 marriage occurred on October 22, 1949, when Virginia Weeks Lowrie became the bride of John H. Glover of 1025 Harvard Road, Grosse Pointe 30, Mich. Dick Blasdale broke into the news in New Bedford, Mass., when the Hathaway Manufacturing Company announced his appointment as chief of the production engineering department. Earle E. Langeland, who received his S.M. degree in Chemistry at the Institute in '31, was recently made plant manager for American Maize Products Company in Roby, Ind. He is married and the father of three boys and a girl. — JOHN N. HIGGINS, *General Secretary*, Apartment 4B, 181 East 161st Street, New York, N.Y.

• 1933 •

After much hinting, suggesting, nudging and prodding, yours truly finally has this in print — no excuses, my folder of clippings has haunted me for months. Now that we are back in stride, we will try to keep this column up to date. Many of the items I have to report are very old but rather than omit any, the following announcements are presented at random. The wedding on August 6 of Robert Shea to Mary Agnes Zimmermann. The wedding of Oliver Churchill Dunbar to Anna Elizabeth Pritchard on May 28. A son to the Harold J. Baker, Jr.'s, on April 28, 1949. A daughter to the Donald G. Finks on May 18. The engagement of Jack Adelson to Sarah Ring on June 9. A son to the I. Harry Summers on May 23. The wedding of William Andrews to Frances Bresnahan in June, 1949. A daughter to the Duke Seligs on October 23. The marriage of Cole Allen to Elizabeth M. Stiles September 25, 1949. A daughter to the Horace Leavenworth Newkirks on April 23, 1948. Newkirk is a physicist in the Michelson Laboratory in California.

An interesting article on the travels of A. F. Spilhaus who now carries the label "Global Technologist." He is dean of technology at the University of Minnesota and has been a world traveler during the past few years. W. W. Newton recently was elected president of the Dallas Geophysical Society. A note from Carroll Newton in Denver, Colo., said that he is pursuing study and research on the problems of sedimentation in "alluvial rivers." The program involves travel and observation throughout the west, followed by graduate study at the University of Minnesota. S. S. Saslaw promoted to associate professor at the United States Naval Academy. John Sterner a principal in the firm

of Baird Associates, industrial physicists. John W. Campbell, Jr., editor of *Astounding Science Fiction Magazine*, Elizabeth, N.J. Elton Roberts has been named to the post of construction examiner for the Federal Housing Administration. Tucker M. Vye appointed administrator of the Addison Gilbert Hospital, Gloucester, Mass. Ralph L. Garrett was candidate for the Republican nomination for representative in the 25th Middlesex district.

Richard W. Ruble, captain, in command of the Navy's 27,000-ton aircraft carrier *Valley Forge*. Joseph Walton Langford, assistant professor of Electrical Engineering at the University of Massachusetts. An interesting write-up on the activities of William Benedict, assistant in health education, Connecticut State Department of Health, on sex education in Connecticut schools. William L. Walsh was appointed manager of the Rensselaer, N.Y., plant of the General Aniline and Film Corporation. Two items from Harry Summer: 1. Peter Parker with Kolar Labs, Inc., cosmetic manufacturers, is married and has one child. 2. R. G. Seyl operates Seyl Labs, electric corrosion consultant. Dick Morse again in the news as a director of Apple Concentrates, Inc. A note from H. K. MacKechnie tells us that he, too, is with Baird Associates, Inc., as a senior engineer in charge of electrical engineering department — for more details see the December issue of *Fortune*. Several very interesting write-ups on the activities of Art Hungerford in the field of Navy teaching via television. Art is with the Special Devices Laboratory of the Navy in Port Washington, Long Island. A note from Gus Kidde from the Filtril Corporation in Los Angeles since the summer of 1948. Donald A. Robb appointed town engineer in Springfield, Mass. Dave Nason was appointed assistant purchasing agent of New Holland Machine Company. Frank K. MacMahon with W. D. Aitken Company in East Braintree. Joe Dysart, maintenance manager, Pan American Airways at Miami.

Don Fink has been appointed chairman of the Joint Technical Advisory Committee by the board of directors of the Institute of Radio Engineers and Radio Manufacturers' Association. During the War, Don was a consultant at the M.I.T. Radiation Laboratory and was one of the chief developers of the Loran system of long-range navigation. Maxwell D. V. Millard has been promoted to the position of manager of the Detroit sales district of the American Steel and Wire Company. Dominic J. Chiminiello reported as a logical candidate for one of the school board committee men in Quincy, Mass. A note from John Longley reports a new home in Slingerlands, N.Y., just outside Albany. Steve Avakian was a candidate for the school committee in Leominster, Mass. He is associated with Commonwealth Plastics, Inc. T. C. Johnson has been appointed as engineering staff assistant of the air conditioning department at the Bloomfield Works of the General Electric Company. Heard from Jim Vicary who is doing very nicely in his Ervite Corporation in Erie, Pa. W. L. Sorensen, Warren Woolen Company, Stafford Springs, Conn. G. M. Kincade, Jr., Cleveland Corrugated Box

Company, division of General Container Corporation, Cleveland, Ohio. John Rumsey with Jervis B. Webb Company at Detroit. Malvin Mayer at Schwarz Laboratories, New York City. Dick Valentine, New Departure Division, General Motors Corporation, Cleveland, Ohio. D. L. Babcock, Camera Works, Eastman Kodak Company, Rochester, N.Y. Ingvald Madson, Association of Iron and Steel Engineers, Pittsburgh. A note from Stanley Sapery, a new home in Mamaroneck, N.Y. Has a boy nine and a girl four. He started his own sales agency in 1947 in all types of manufacturing and fabricating of plastics. A note from Athelstan F. Spilhaus — Dean at the Institute of Technology at the University of Minnesota (also called M.I.T.).

Bill Barbour's Tracerlab, Inc., announces their new "Beta Gauge," an atomic method to help control production by measuring the thickness of industrial products. Pierre du Pont elected a director of the Du Pont Company in 1948 — manager of rayon tire yam sales. Another bulletin on Pete is election as trustee of Phillips Exeter Academy. Pete is still active in Planned Parenthood Campaign. S. J. Carter, Carter Laboratories, Hayward, Calif., a new process for concentrating fruit juices and milk through freezing. Wallace E. Tobin is a candidate of the school board of Tisbury, Mass. An article in the Jamaica, *Long Island Press* describes the activities of M. L. Brashears, Jr., as geologist for the United States Geological Survey. Dr. Bernard Lapidus is chief of staff of the medical clinic of the Burroughs Newsboy's Foundation in Boston — a volunteer activity, examining boys on a weekly basis. A very fine activity. I recall some years back when Herb Grier and "yours truly" were volunteer workers at the Burroughs Newsboy's Foundation. John W. Lane, Chairman and Vice-president of the Atlas Electric Devices Company in Chicago, Ill. C. W. MacMillan writes that after the War he and his family moved to sunny Florida and they stayed for about three and one-half years. He has now moved back to Rock Island where he is searching for a *Chez-Moi*. More details later.

Again my apologies for some of the stale news included above. I hope all candidates were elected but I did not receive follow up bulletins. From now on we will try to keep the column on a current basis. Drop us a note once in a while and help keep this column alive. — GEORGE HENNING, JR., *General Secretary*, Belmont Smelting and Refining Works, Inc., 330 Belmont Avenue, Brooklyn 7, N.Y. ROBERT M. KIMBALL, *Assistant Secretary*, Los Alamos Scientific Laboratory, Post Office Box 1663, Los Alamos, N.M.

• 1935 •

Plans are rapidly taking shape for our 15th reunion. Based on results of questionnaires sent to members of the Class, your reunion committee, headed by Jack Colby, has obtained the use of the Hotel Rockmere, at Marblehead, Mass., for the week end of June 10 and 11. This plan will give everyone an opportunity to get back to the Institute on Alumni Day,

Monday, June 12, for the popular annual event that this year includes a symposium on the graphic arts in the afternoon and the banquet at the Copley Plaza in the evening. Copies of "1935 News," announcing details of the two-day reunion, have already been mailed to class members, together with registration cards. Please return these cards immediately with your check for reunion activities. Plans are underway to keep members informed each month of those who have signified their intention to be present by registering. Let's all help to make this reunion an outstanding success by sending in our reservations early to L. E. Packard, Technology Instrument Corporation, 1058 Main Street, Waltham 54, Mass. In addition to more detailed notices in our class notes, the Institute Gazette of The Review will also include information regarding all classes holding reunions.

Acknowledgments of reunion publicity brought the unwelcome news that John A. Miller died suddenly on September 10 in Mobile, Ala. Johnnie was construction engineer in Mobile for the Hollingsworth and Whitney Company, paper manufacturers. Johnnie had an outstanding career with the United States Army Engineers on the Alcan Highway in Alaska and British Columbia, and as a lieutenant colonel in charge of the rehabilitation of utility industries in the Rhine Province, the Saar, and the Ruhr. He is survived by his mother, Mrs. Walter M. Miller, and a sister, Susan, of 1061 Saratoga Street, East Boston.

With the transfer of Lever Brothers' executive offices from Cambridge to New York, Gordon Scowcroft, his wife, Margaret, and seven year old son, James, are leaving Belmont to locate on or near Manhattan. — The Class has a newly graduated member. Fred Wissenbach started out with us back in 1931 when 5:01 and 8:01 held certain real and imagined terrors, but had to interrupt his schooling before our senior year. He dusted off his books and slide rule, however, and earned a degree last June. We hope Fred will be with us at the reunion to give us some recent news on the trials of a Technology student. The steady stream of change of address notices causes me to wonder whether or not M.I.T. fellows ever get to know their neighbors. To mention about one in 20: Bill Cross has moved from Neenah, Wis., to Coosa Pines, Ala.; Al Mowatt from Morton, Pa., to Waltham; Ken Warren from Cleveland to Cranston; Howard Bernhardt from Chicago to Moorestown, N.J.; Johnny Bradner from Cleveland to Greenville, S.C.; John Thorpe from Nashville to Springfield, Ill.; Fred Travers from Kingston, Mass., to New Orleans; and Buckley Crist from Birmingham to Plainfield, N.J. Judging from the reunion notices returned, a great many more fellows have moved to parts unknown. Unfortunately, the reunion committee is more or less limited by the resourcefulness of Uncle Sam's postmen. We lack radar, razor, azon, proximity fuzes, and homing pigeons and our Ouija Board doesn't operate altogether reliably on Channel 1935. — J. BARTON CHAPMAN, *General Secretary*, 7 Lalley Boulevard, Fairfield, Conn.

• 1938 •

Bill Gibson has been transferred from Rome, where he was second secretary and vice-consul, to Calcutta, where he is vice-consul. Bill has been in the Foreign Service since 1941 and has served at Rio de Janeiro, Lisbon, in the Department of State, and Rome. — Harold Acker was recently presented with the President's Award of the Society of Naval Architects and Marine Engineers. Harold is supervisor of the ship structural section in the research section at Bethlehem's Fore River Shipyard. The award was for the paper, "Highlights of Welded Ship Research."

Albert Stone was recently appointed to the position of technical assistant to the director of the Applied Physics Laboratory at Johns Hopkins University. — Ben Siegel was appointed head of Cornell University's new electromicroscopy laboratory last November. During the War, Ben was doing military research at M.I.T. and Harvard and later set up and directed an electromicroscopy laboratory for polymer research at Brooklyn Polytechnic Institute. His most recent work before going to Cornell was with the Research Laboratory of Electronics at M.I.T.

We hope to see a real group of '38 men at the June Alumni Day. Note the change: It will be at the Copley Plaza on Monday, June 12, and '38 will have a room for a general get-together at the Copley Plaza before the banquet. See next month's column for more details. — ALBERT O. WILSON, JR., *General Secretary*, 32 Bertwell Road, Lexington 73, Mass. RICHARD MUTHER, *Assistant Secretary*, Methods Engineering Council, 822 Wood Street, Pittsburgh 21, Pa.

• 1939 •

The Class extends its deepest sympathy to William (Doc) F. Wingard, our President, on the loss of his wife, Gail, on February 18.

This month we'll give forth with news that has filtered through to your Assistant Secretary in the Boston area. Your writer had lunch on January 31 with Fred Grant, Bob Casselman and Oz Stewart to discuss our part in the current drive to obtain money for M.I.T. The four of us, with Herb Stewart, are a committee of five assigned to the Greater Boston area for the Class of '39. Fred informed us as to why money is needed and it is hoped that the members of our Class will do their utmost to help. Fred is currently with Auto Bar of Boston, Inc., as president and treasurer. They distribute a gadget that is used in bars to make sure you get what you pay for; as well as to prevent the bartender from giving too many away. Bob Casselman is still pushing sales of the Land camera that we enjoyed watching him use at the reunion. Oz Stewart is holding forth as an engineer at Dewey and Almy in Cambridge.

We had an announcement from Nick and Lynn Carr that they became proud parents of a baby girl, Anna Louise, on September 21. Nick is still with American Viscose in Marcus Hook, Pa., as manufacturing superintendent. One of our most eligible bachelors, Dick Leghorn, is going to take the big step. His engage-

ment to Nancy Catherine Holtzman was announced in Rochester, N.Y., in December. The engagement of Fred Schaller to Anne F. Knott was announced in January. Best of luck to both of these fellows.

An interesting article about John West was published in the Rochester, N.Y., *Democrat and Chronicle*. He is president of the Westplex Corporation, manufacturers of plastic boxes and other plastic materials. In the promotion department, we hear that M. Wren Gabel, who received his master's degree with us, has been made assistant to the vice-president and general manager of Eastman Kodak Company. George Poulsen has been promoted to assistant to the division engineer in the induction voltage regulator engineering division of General Electric at Pittsfield, Mass. Congratulations to you both.

Alan Schreiber lectured before the Worcester section of the American Society of Mechanical Engineers early in January. He talked about atomic uses in industry. He is industrial sales manager of Tracerlab, Inc. Barry Graham spent an evening recently with Fred Grant. He is with the Aluminum Company of Canada, working on the sale of aluminum foil. Two summers ago, he attended the international school of the Aluminum Company in Switzerland. He is married and has two daughters. Talked with Eli Danenberg who is now a section head in research and development at Godfrey L. Cabot, Inc. He is married, has two children, and is just about ready to move into a new home in Newton. He has published several papers on rubber and carbon black and is to give a lecture at Technology before the division of rubber chemistry of the American Chemical Society.

The writer sees Henry Fober quite often at the A. C. Lawrence Leather Company in Peabody, Mass. He is doing research and development work in their sheepskin and shearing divisions. Charlie Mercer is working here in Boston as a sales engineer for the Aluminum Company of America. He and his good wife, Louise, have two boys and are living in a house out in Weston that is 150 or so years old. They have redecorated the house and landscaped the grounds and do a little farming on the side, including raising rabbits and goats. — Please send clippings and personal notices to one of your secretaries so we may be able to make this an interesting column. — STUART PAIGE, *General Secretary*, 701 Mill Plain Road, Fairfield, Conn. GEORGE BEESLEY, *Assistant Secretary*, Whittemore-Wright Company, Inc., 62 Alford Street, Charlestown 29, Mass.

• 1940 •

Tenth Reunion, Class of '40, June 10 through June 12, 1950. Robert Bittenbender, chairman, 287 Waban Avenue, Waban 68, Mass. Bob has announced that Dick Berry, Walter Schuchard, Russ Haden, and Bob Millar are helping him greatly on the reunion committee and that others may be appointed soon.

Frank Penn was recently appointed assistant to the president of the Minute Maid Corporation. He served as chief engineer of the corporation's main plant at Plymouth, Fla., prior to this new appoint-

ment. — A Fellow Award was conferred upon Claude E. Shannon by the Institute of Radio Engineers at its annual convention held March 6 to March 9 at the Hotel Commodore and Grand Central Palace, New York City. The rank of Fellow, the highest membership progression in the Institute, is an honorary grade bestowed by the board of directors of the Institute, professional organization dedicated to the theory and practice of radio and electronics. The award was conferred upon Mr. Shannon, a member of the technical staff of the Bell Telephone Laboratories, Inc., Murray Hill, N.J., "for his contributions to the philosophy of new pulse methods and to the basic theory of communications."

The Pittsburgh Corning Corporation announced that R. W. McKinley, product development engineer, was a speaker at the School Lighting Forum held in Washington, D.C., in February. The forum was sponsored by the Capital section of the Illuminating Engineering Society. Mr. McKinley, formerly editor of the *Illuminating Engineering Society's Lighting Handbook*, is at present a member of the Society's committees on daylighting, office lighting and publications. An expert on planned daylighting, Mr. McKinley talked on "Planned Daylighting in School Buildings."

Katherine E. Hyder and George T. Kaneb were married the latter part of 1949. Rosemary Eleanor Lyden and Philip G. Brady were also married in late November of 1949. — H. GARRETT WRIGHT, *General Secretary*, Garrett Construction Company, 510 Sherman Avenue, Main Post Office Box 629, Springfield, Mo. THOMAS F. CREAMER, *Assistant Secretary*, 6 Berkley Road, Scarsdale, N.Y.

• 1941 •

Whenever your column is delayed or does not appear for several months the chances are that your Secretary is back at school and such is the case at present. Our apologies and resolutions to do better. But on your side we might say that the dearth of letters is hardly conducive to preparing a readable set of notes. We would appreciate hearing from anyone who has a two cent postcard, a pencil and a moment to jot down a few pertinent details concerning his activities in work and at home. But enough of that, let us take a look at the marital column for our ever dwindling batch of single '41 men. Jeanne Gesell was married to Doug Watson in January. Ruth Smith became Mrs. Richard Collins last September. Dick is an engineer with General Motors in Linden, N.J., and served with the Army Engineers for two years in Europe. Patricia Tobin became Mrs. Bud Ackerson in October. Bud served with the Ordnance Department during the War and we saw a bit of his activities while in Philadelphia. Bud is now with the Deacy Products Company in Cambridge. Sterling Ivison took Katharine Brown as his bride in May of last year. Sterling is a two-and-a-half striper with the Bureau of Aeronautics of the Navy Department.

There is some news on the official activities of '41 men. The destroyer *Bailey*, which was recently on public exhibit in Gloucester, Mass., a famous fishing center

north of Boston, was commanded by our classmate, Commander Ray Thompson, once member of an Olympic swimming team. Another Navy man who came up to Cambridge after his Annapolis studies is Howard Stoner who has just taken over as operations officer of the staff of Rear Admiral James Fife, Commander of the Atlantic fleet submarine forces. Charles Peck received an appointment as assistant professor in the Civil Engineering department at Carnegie Tech in Pittsburgh. Mark Brown, a major in the Air Force, has moved to Albrook Field in the Panama Canal Zone. Dwight Mowery has recently been appointed an instructor in chemistry at Trinity College in Hartford, Conn. Mert Richardson has been appointed as supervisor of edible technical services (that is what the paper said) in the Lever Brothers research department in Cambridge. Mert was with the Quartermaster Corps during the War and was connected with the subsistence laboratories. We heard quite a bit recently about the hotel situation in Brazil. It seems that Marcio Alves, who studied at the Institute and spent some time in the office of the mayor of Petropolis, resort city near Rio, has built a new hotel called the Ambassador. Most notable feature about the edifice is its 17th floor roof restaurant with the large picture window looking out on Botafoga Bay in a fashion quite similar to the Mark Hopkins in San Francisco.

Al Hartman was recently appointed sales manager of the vacuum equipment division of Eastman Kodak's Distillation Products. Roger Robertson has recently joined the Bureau of Standards to work in the guided missile project of the electronics division. Roger was an electronics engineer at the Bell Aircraft Corporation until recently. From 1942 to 1946, he was on General Electric's technical staff. Irvin Liener recently received his Ph.D. in Biochemistry and Nutrition from the University of Southern California. George Clark recently gave an interesting paper concerning the lighting of television studios in Millis. George is with the Sylvania Electric Products Company. Dave McNally has been named assistant parts and service manager for the Packard Motor Car Company and is assigned to zones in the eastern United States. Dave spent four years with the Army Ordnance and was released from service as a lieutenant colonel.

We attended the Midwinter Meeting of the Alumni Association and enjoyed hearing of the new developments projected at the Institute. There we met Will Mott, Class President; Ed Beaupre, the construction czar of Keene, N.H.; Hank Avery who is with Godfrey L. Cabot, Inc., in Boston; Ed Marden in the construction business with his own firm here in Boston; and Sam McCauley of the Atlantic Refining Company in Philadelphia. We meet Ken Newton and Rog Finch (both professors) now and then in the halls of the Institute; and also Ken Bohr, who is doing work in the economics department. A long letter was received from Leon Crane but that will have to wait until next month. — STANLEY BACKER, *General Secretary*, 335A Harvard Street, Cambridge 39, Mass. JOHAN M. ANDERSEN, *Assistant Secretary*, Saddle Hill Farm, Hopkinton, Mass.

I could be dramatic, and start this column by saying that the millennium has arrived and so on; because, believe it or not, two (count them — two!) of our classmates responded to my call for personal news. But I won't be dramatic. Rather, let me extend grateful greetings to Virginia Carter Grammer, and Jack Leonard, the two sterling correspondents. Jinny's letter brings news not only of herself, but of her husband, Reynold, also. She writes: "Rey is working as a junior design engineer in the Navy Ordnance division of Eastman Kodak. Extremely hush-hush except for the general opinion that everyone in the city but the wives of the engineers knows about it. My gainful employment on anything like a professional level has been slight. I worked as a test engineer on the network analyzer at General Electric in Schenectady, when Rey was completing VI-A, and spent 10 weeks with the University of Rochester's physics department in 1947 in a strictly secretarial capacity. I did learn a lot, since my first job was the preparation of the first annual report of their '130' cyclotron . . . and I kept in trim by spending occasional lunch hours doing problems in the vector analysis exams I had to type. I might have stayed except for Elizabeth Charlene's arrival on New Year's Eve in 1947. . . . I did take a Lit course at the U. of R. the following fall to prepare the way for further study . . . with the intention of studying whatever phases of structural engineering and architecture I can by myself as soon as I get the family and house tamed again. Our second tax exemption, a son, Rey, 3d, arrived November 14, 1949. . . . We lived in a trailer when we first came out here, but bought our house a year ago last September. . . . Our musical activities have decreased considerably, . . . but both Rey and I sang in the Oratorio Society last year, and as members had the pleasure of doing the 'Damnation of Faust' last spring with Eric Leinsdorf." With this very interesting letter Jinny enclosed snapshots of her two very charming children. Jinny and Rey's address is 202 Nahant Road, Rochester 12, N.Y.

Jack Leonard's letter comes all the way from Coulee Dam, Wash. Jack takes us back to graduation in bringing us up to date on his doings. He writes: "After graduating, I went with the crew to Poughkeepsie and Seattle. Following the Seattle Regatta, four of us, Johnny Banks '48, Bill Reynolds '49, Bub Weber '50, and myself, bought a car and toured the West. I spent the rest of the summer in Kentucky playing golf, and so forth. . . . In October, I returned to God's corner of the country, the Northwest . . . and pounded the streets of Portland looking for a field job with a construction outfit. . . . I went to work for Morrison-Knudson in their Seattle office. Christmas day I was transferred to the atomic plant at Richland as office engineer. I was promoted to field engineer there and started another job in September of '48. In October, I was transferred to Coulee Dam where I've been 15 months. I hang out at the pumping plant. When done, spring '52, it will pump water through twelve 65,000 H.P. pumps to ir-

rigate a million acres of virgin land. For the benefit of the New Yorkers in the audience, one of the 12 would keep you going — and Fridays too. Took a trip back East last Christmas and saw quite a few of the boys. Fred Howell is with American Gas and Electric, making gas, I guess. Dick Potter is a peddler for Brown and Sites. Lucky LaPier makes toothpaste at Colgates." Thanks Jinny and Jack.

After a year with United Aircraft Corporation, followed by a year with Good-year Aircraft, Al Richardson has returned to the fold, and is now with the Aero-Elastic and Structures Research Laboratory at the Institute. It is just possible that Al's move was motivated by other than professional considerations. He very recently announced his engagement to Phyllis Brosnahan of Somerville. Al brings news of other classmates with him. He tells us that Joe Riley is working for A.T. and T. in Philadelphia, and lives a comfortable married life in New Jersey. Arnold Winslow and wife Grace are living in Greentown, Pa. He was working for Carnegie Illinois Steel Company, but Al thinks he has since changed his position. Bob Corless is working with his Dad in Texas. Bill McCurdy, Ted Davis, Jim Cooley, and Gene Gettel are all still with United Aircraft in East Hartford, Conn.

I spent New Year's week end in New York, where, quite by chance, I met Barbara Snow. She is now a medical student at New York University, and tells me that Bob Dye is in several of her classes at Bellevue. The Midwinter Alumni Meeting, held in Morss Hall, was very interesting; but 1947, I'm sorry to report, was represented by only four members — Al Richardson, Jack Rizika, Bob Warner, and myself. Let's hope we do better on Alumni Day in June. I met Gabby Ploen in Building 7 not too long ago; he is at the Institute until summer, and he was very quick to whip out a snapshot of his son and heir, Richard Emery. Fine-looking lad, too. Jerry Cox informs me that our Class Agent, Walt Kisluk, is a traveling salesman.

John Blackwell, who has recently completed a two-year study of traffic flow, parking and shopping at Arlington Center, and has done similar work for the town of Lexington, has been named to head the field work in connection with the planning study of Falmouth. John's assignment will be to make a town-wide economic and financial survey, to examine traffic flow, and to study other related assignments. It was with some surprise that I discovered the smiling face of Norm Meullen beaming forth from the pages of the February 4 issue of *The Saturday Evening Post*. According to the American Iron and Steel Institute, in whose advertisement Norm appears, he is quoted as saying: "I own stock in a steel company, and to me this means an investment in America. America's strength is in private industry, and industry's strength lies with its investors." The ad lists Norm as an aerodynamicist of Buffalo, N.Y.

At the age of nine months, Bobby Seaman, son of Dick, has broken into print. *The Christian Science Monitor* printed quite a lengthy article, together with a photograph, illustrating how Bobby accompanies his mother on her shopping

tours — Indian style in a homemade Indian cradle. To quote *The Monitor*, "Lo, the happy papoose."

Engagements and weddings are, as usual, fairly numerous. The betrothals of Mina Jean Gallup of Grosse Pointe Park, Mich., to Bill Froehlich; Maryanne Dunn of Salem to Frank Carey, who is now attending the Boston University College of Business Administration; Jenny Lou Johnston of Rose Valley, Pa., to Tom Porter; Martha Ritzhaupt of Galion, Ohio, to Walt Ericsson; and Anna Marie Given of New York to Roger Williams were announced early in the year. Rog Williams is with McGraw-Hill as executive editor of *The Chementator*, and associate editor of *Chemical Engineering*; and is president of Roger Williams, Inc., investment brokers. Other engagements include those of Virginia Carolyn Wiley of Rye, N.Y., to Mike Rosar — Mike is now with the National Broadcasting Company; and Wilma Ruth Hahn of West Haven, Conn., to Ray Hasse. Ray, a lieutenant, j.g., is project officer at the United States Naval Underwater Sound Laboratory in New London, Conn.

Marriages we have word of are those of Marguerite Van Nest of Hoquiam, Wash., to John Galt — both bride and groom are with the Bell Laboratories in Murray Hill, N.J.; Miriam Bloomberg of Swampscott to Larry Shutzer; Elizabeth Bond of Buffalo, N.Y., to Larry Michel; and Lois Jean Carp of Saint Louis, Mo., to Ken Marshall. The Marshalls are residing at 721 Berick Drive, St. Louis.

In the next set of notes, I hope to report to you the outcome of an executive committee meeting of our Class to be held shortly. We hope to discuss such weighty matters as the class gift, a news questionnaire, and perhaps most important of all, our five-year reunion, which is just two years off! Present will be President Norm Holland, Class Agent Walt Kisluk, Alumni Council Representative Jim Phillips, and yours truly. CLAUDE W. BRENNER, Room 23-130, M.I.T., Cambridge 39, Mass.

• 1948 •

The Law of Diminishing Returns appears to have set in, at least as it applies to correspondence from '48 men; and that which follows has been primarily supplied by the M.I.T. clipping service—bless 'em. Announcements of weddings and engagements again account for most of our not-too-current news. While all these couples are certainly wished the very best of luck, we remaining bachelors (a rapidly vanishing species, like the buffalo or cigar-store Indian) somehow wince with envy as we watch the removal of all those attractive, eligible women from the marriage market.

Engagements of which we have received word are as follows: November: Hal Field to Joyce Fineman; James Connors to Jean Murray; Irving Kagan to Paula Gelb. December: Martin Billett to Joyce Forman; Ian Macdonald to Margaret Pratt; Albert Shelby, 6-45, to Elizabeth Griffinger; Bill Grant to Patricia McCaffrey; Bill Oard to Lorna Steele;

Richard Worrell to Betty Winberg; Walter Mellen to Ellen Beardslee; Norman Nau to Ruth Canning; Robert McDonagh to Rita Fillion. January: Frederick Radville to Dorothy Anne Weafer; Bill Allen to Marjorie Gautreau; Bruce Kline to Beverly Tibbetts; George Cooper to Nancy Cooper; Merle Andrew to Alice Hale; and the engagement announcement of one of our coeds, Margareta Backer, to Charles Dobony, a midshipman at the United States Naval Academy. Since graduation, Miss Backer has been majoring in voice and opera at the New England Conservatory of Music. Her S.B. degree was in Physics.

The following '48 bachelors of science became '49 masters of households: Duane Rodger was married to Patricia Dunham on December 9, and they are now residing in Chestnut Hill; Bob Wofsey, now an industrial engineer with the Metropolitan Life Insurance Company, to Marcia Gurtwitt, December 18; Martin Jacobson, currently an industrial engineer with the Bulova Watch Company, to Pauline Hytmoff, January 1; David Brown to Emily Goedecke, also on January 1; Walter Bertaux to Juanita Brown, December 19; Marshall Baker to Dorothy Russell, December 26; Harry Parke to Ursula Gorman; Richard Sweeney, employed at present as a sales engineer with Bay State Abrasives, to Jean Mower, November 26.

Members of '48, by virtue of having received an S.M. degree in that year, who were recently married are Hugh Richardson to Marjorie Lester; Richard Quinn to Helen Stellato; Andrew Mazzotta to Carolyn Heaton; and Frederick Smith to Doris Noke.

One of the few letters received was from Norm Kreisman who in September completed training at a printing trade school in Tennessee and is now working in the production department of a printing firm until he learns the "inside" — then, selling. Bob Springmeyer is an architect with the United States Department of the Interior, Indian Service way out in Ogden, Utah, and evenings teaches school at Weber College. Among the first of our September classmates to achieve national recognition is George Macomber who, we read, was 1949 national champion in downhill and slalom skiing and is currently a member of the United States team in the forthcoming 1950 World's Championship Ski Tournament. Denman McNear has spent the last two summers as a student trainee for the Southern Pacific Railroad out in California, while attending Stanford Graduate School of Business the remainder of the year. Mac will get his master's degree in Business Administration in June and plans to continue thereafter as a permanent employee of Southern Pacific in their engineering department. Michael Oglo is now in Chicago as a market analyst for Shakeproof, a manufacturer of specialty fasteners for mass production industries; with evenings being spent studying liberal arts at Northwestern University. — From the domestic front, we have word of but two new births from our 1,100 classmates: a son, Stephen, was born last July to George and Jean Shields; and a daughter, Ann Katherine "20 inches long, 2780 grams in weight, nice job, all

around" to Boni and Margaret Martinez, January 17.

Occupational briefs garnered from various and sundry sources: James Sheehan, who returned to the Institute for his master's degree, has just accepted a position as analytical engineer with the Fairchild Engine and Airplane Corporation in Oak Ridge, Tenn. George Maring, who received his M.S. degree from Columbia last July, is now a chemical engineer for the Sinclair Refining Company, Harvey, Ill. James Hourihan, another Course X man, recently completed a 25,000-mile, 11-month, business trip through 42 states, taking movies all the way. — WILLIAM R. ZIMMERMAN, *General Secretary*, in care of Kurt Salmon Associates, Inc., 3000 Albemarle Street, Washington, D.C. RICHARD H. HARRIS, *Assistant Secretary*, 19 Lancaster Street, Worcester, Mass.

• 1949 •

Via the South Wales *Evening Post*, we learn that Bertram Collins, who was awarded a Rotary International Scholarship, had spoken before the Cardiff Rotary on his initial experiences in Wales. Bert is majoring in British industrial relations at the University College of Cardiff, Wales. At the annual National Motor Boat Show in New York, Chet Patterson introduced a 26-foot, single-place rowing shell he designed. The innovation, molded from plastic fiber glass making it rot and leak proof, is expected to replace the present use of wood. Joseph Pigott's thesis "Effect of Cutting Fluids Upon Chip-tool Interface Temperatures" merited the annual American Society of Tool Engineers' prize which was presented to him at a meeting of the Boston chapter. Joe is now with the Draper Corporation, Hopedale, Mass.

Received a letter from the First National Stores of Hartford, Conn., signed by Paul Weamer. Paul was engaged Christmas eve to Virginia Looney of Belmont, Mass. He spent the summer in a training program and is now in the purchasing department. Tom Hilton forwarded a letter from Richard Logan. Seems Dick is a chemical engineer gone astray. The new field is merchandising and the place is River Forest, Ill. The appointment of Richard Saville to the teaching staff of Barre, Mass., was announced. Seven Ph.D.'s wandered into the DuPont fold. They are Roland Barriault, Theodore Foster, William Langsdorf, Ward Haas '43, Robert Kallal, Dewey Sandell, and Harry Stanley. Richard Morel is with Fish Constructors, Edgewater, N.J. Howard Millard, with E. W. Pilling of Dedham, moved into a new home in Islington, Mass.

I have a complete card index with the latest addresses of all men who graduated in '49. So, if you lose track of someone, drop me a line, and I will forward his address to you. Since someone might desire yours, help me keep the index up to date by sending in any change in address you may have. — CHARLES W. HOLZWARTH, *General Secretary*, Morris C-36, Harvard Business School, Soldiers Field, Boston 63, Mass.



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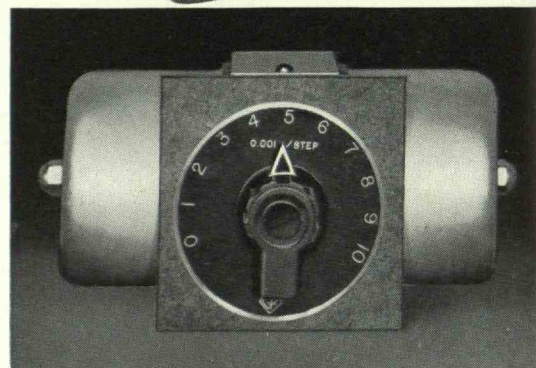
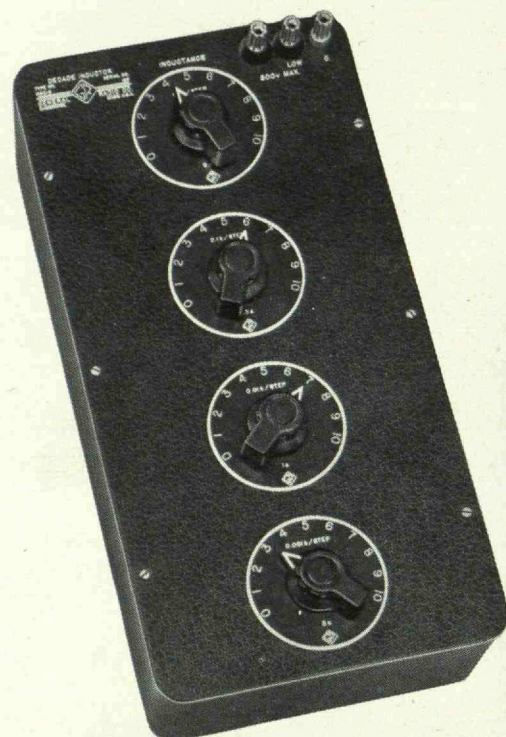
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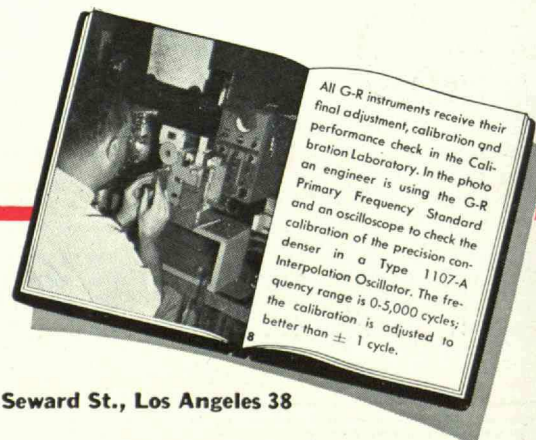
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